

THE RAILWAY GAZETTE

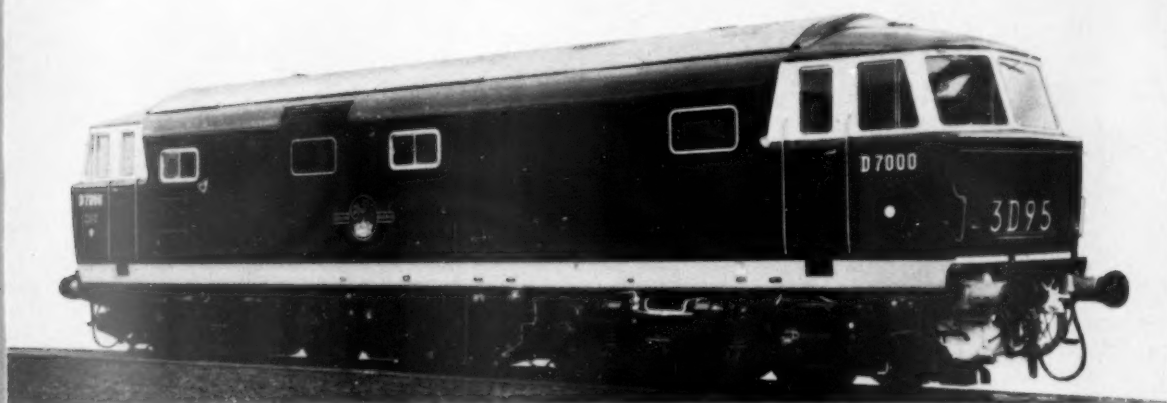
Price: Two Shillings

FRIDAY, JUNE 16, 1961

Annually £5 by post

TOMORROW'S LOCOMOTIVES

~~**TODAY**~~
YESTERDAY



Delivery has commenced of the first of
95 HYMEK DIESEL-HYDRAULIC LOCOMOTIVES
and they are going into service on the
WESTERN REGION, BRITISH RAILWAYS

BEYER PEACOCK (HYMEK) LTD.

Uniting the railway traction resources of BEYER PEACOCK • BRISTOL SIDDELEY ENGINES • STONE-PLATT INDUSTRIES

LOCOMOTIVE HOUSE, BUCKINGHAM GATE, LONDON, S.W.1

BELFORT

*... the real wood
veneer laminate with
the melamine surface*



Belfort Afrormosia used for panelling in the new Railway Coaches. Photograph reproduced by permission of London Midland Region, British Railways.

Designers have for centuries found that fine woods are the well-tested medium of their art.

In the field of design "Belfort," with its superb appearance and durable surface qualities is available in an extensive range of woods to appeal aesthetically to interior designers and railway carriage builders.

"Belfort" is ideally suited for every application where decorative wood surfaces are required.

"Belfort" laminates are available in panels 8' x 4' and in two thicknesses, $\frac{1}{8}$ " and $\frac{3}{16}$ "



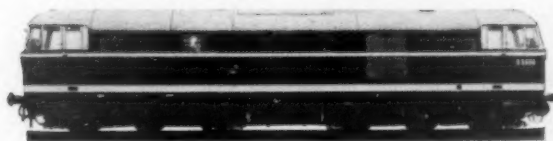
BONDED LAMINATES LIMITED

C. H. N. VENEER MILLS, CHISENHALE ROAD, LONDON, E.3 Phone: Advance 2005

*For descriptive literature and samples, please
write to the main Railway Distributors:*

W. A. BONNELL (1924) LTD., 8 WESTMINSTER PALACE GARDENS, ARTILLERY ROW, LONDON, S.W.1 ABBey 1061





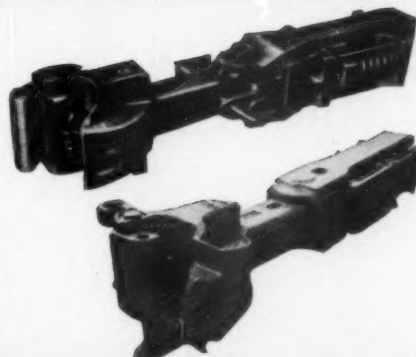
One piece cast steel **BOGIES**



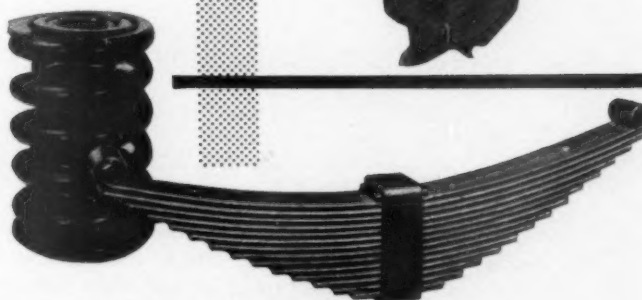
Motor Bogie Frame supplied to Beyer Peacock Ltd. and W. G. Bagnall Ltd. for the 1,250 h.p. A1A-A1A Diesel Electric Locomotives built by the Traction Division of Brush Electrical Engineering Co. Ltd. for the British Transport Commission.

Automatic **COUPLERS** and Draft Gears

Assembled from parts of simple rugged design these couplers ensure safety to operatives, are easy to operate and require minimum maintenance.



SPRINGS laminated coil and volute



for all types of Railway Rolling Stock

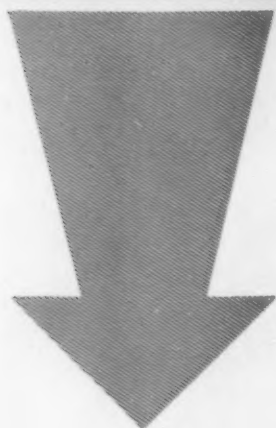


ENGLISH STEEL

ENGLISH STEEL CASTINGS CORPORATION LTD.
ENGLISH STEEL SPRING CORPORATION LTD.

River Don Works, Sheffield

Wholly owned subsidiaries of English Steel Corporation Ltd.



BRAKES IN AFRICA



Air, Air/Vacuum and Vacuum Brake Equipment from the Westinghouse factories is extensively used all over the continent of Africa, on passenger and freight stock, steam, electric and diesel locomotives and the illustration shows one of 135 Class 5E1 locomotives supplied by A.E.I. Ltd., now in operation on South African Railways, fitted with Westinghouse Vacuum-Controlled Straight Air Brake Equipment.

Westinghouse Electro-Vacuum Braking is also fitted on the 400 coaches now running on the Cape Western Electrification and on the 349 coaches of the Reef Electrification.

Brakes designed and made in England by:-

Westinghouse Brake and Signal Co. Ltd., 82, York Way, London, N.1

Westinghouse Brake (Australia) Pty. Ltd.,

Cairncross West, N.S.W.

Saxby & Forman (India) Private Ltd., Calcutta

Westinghouse Brake & Signal Co. S.A. (Pty.) Ltd.,

Johannesburg. Agents: Bellamy and Lambie, Johannesburg



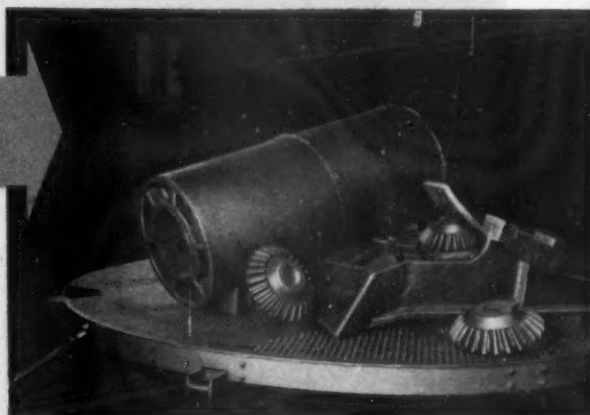
Foundry and Engineering Service for Industry

Our foundries and engineering shops, the largest in South Wales, provide a service, not only to the nation's steel industry, but to a variety of industries throughout Britain and the world.

STEEL CASTINGS BEING REMOVED AFTER SHOT BLASTING OPERATION

Carbon Steel Castings up to 10 tons.
Spheroidal Graphite Iron Castings up to 10 tons.
Non-Ferrous Castings up to 15 cwt.

The 'Centriblast' machine illustrated is capable of shot blasting 15 tons of material at one loading.



GAS MAINS BEING WELDED ON OUR 'FUSARC' MACHINE

Steel construction, Fabrication and General Repair Work.
All Types of Fabrication of mild and alloy steels
up to 25 tons.

The 'Fusarc' welder has a 50 ft. straight run and a reach of 50 in.; it is also equipped to carry out 'submerged welding'.



TABLE ROLLERS IN COURSE OF ASSEMBLY

Machine and Erecting Shops. Our machine and erecting shops with 30-ton gantries are equipped to handle light and heavy machine work.
Special-Purpose Machines. We undertake the complete manufacture of machines to customers' design.

The Table Rollers illustrated are for the strip mill being built for the Ebbw Vale works by Davy & United Engineering Co. Ltd.



Richard Thomas & Baldwins Limited

SALES DEPARTMENT, FOUNDRY AND ENGINEERING WORKS, MACHYNYS, LLANELLY, CARMS.
Telephone: LLANELLY 3291 (4 lines)

Head Office: 47 Park Street, London, W.1

Further Foundries and Engineering Facilities at our
LANDORE GROUP OF WORKS, Swansea



'Cambrian'



rolling stock



Steel, Aluminium and Timber
Wagons of all descriptions and
capacities for home
and overseas railways.

Laminated spring
manufacturers

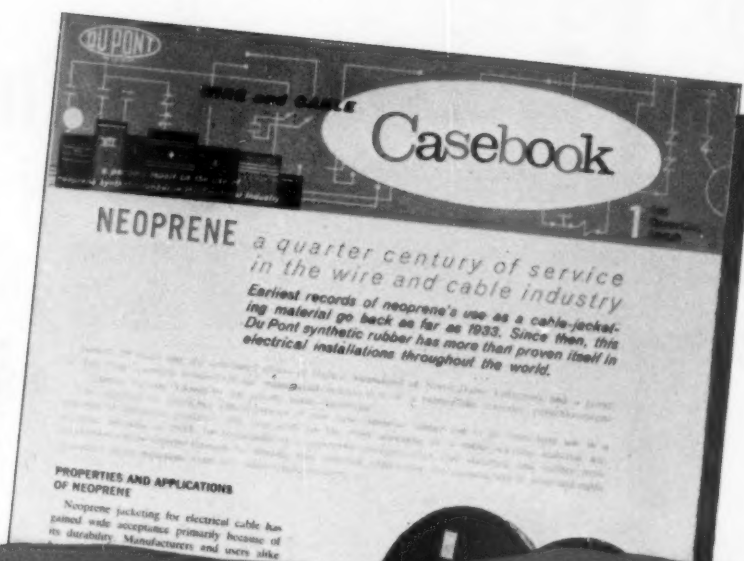


PDE **POWELL DUFFRYN ENGINEERING CO. LTD**

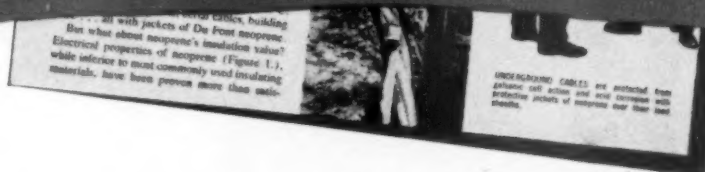
CAMBRIAN WORKS, MAINDY, CARDIFF • Telephone: CARDIFF 29611 • Telegrams: PEEDENG, CARDIFF

London Office: 19 Berkeley St., W.1. Telephone: Hyde Park 7010

HOW TO SOLVE YOUR WIRE AND CABLE PROBLEMS



GET THIS NEW FREE QUARTERLY CASEBOOK ON MULTI-PURPOSE DU PONT NEOPRENE JACKETING



IMPORTANT NEW APPLICATIONS

This new series of *Wire and Cable Casebooks* will keep you up-to-date on all the latest uses of Du Pont neoprene — in switches, connectors, accessories and the many other products being developed for today's rapidly growing electrical industry.

All engineers — civil, electrical and industrial — will find this series of booklets a valuable source of information. The *Wire and Cable Casebook* documents neoprene's quarter century of service in the electrical industry. Du Pont neoprene is the elastomer that combats weather, sunlight, ageing, flame, ozone, corona, heat, oil and grease, as well

as mechanical wear. Detailed reports of successful long-term applications — both overhead and underground — show you why industry has placed such confidence in Du Pont neoprene jacketing.

SEND IN YOUR NAME AND ADDRESS AND GET THE QUARTERLY CASEBOOK—FREE!

Du Pont will send you a free copy of *Wire and Cable Casebook* every quarter. Take advantage of this easy way to keep yourself well-informed about Du Pont neoprene and the other Du Pont elastomers. Fill in the coupon below and post today.

NEOPRENE



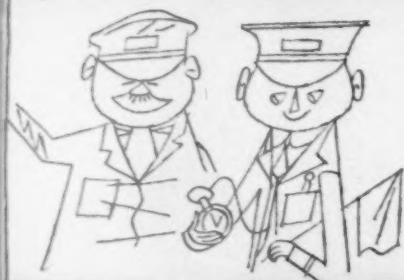
REG. U. S. PAT. OFF.
ESTABLISHED 1802
BETTER THINGS FOR BETTER LIVING
... THROUGH CHEMISTRY

Du Pont (United Kingdom) Ltd., 76 Jermyn Street, London S.W.1, England. Please enter my name for a free subscription to the new quarterly, **Wire and Cable Casebook**. *Railway Gazette* 6/61

NAME.....
POSITION..... COMPANY.....
ADDRESS.....
CITY..... COUNTY.....

Everybody gains

with Ferodo non-metallic brake blocks!



THE TRAIN CREW find that Ferodo non-metallic brake blocks reduce overall braking distances and dramatically improve train control at high speeds. High-speed brake application creates high temperatures: where cast-iron blocks soften and fuse, Ferodo non-metallic blocks act with full effect.



THE TRAFFIC MANAGER can safely plan higher speeds, tighter schedules and more intensive working.



THE ROLLING STOCK ENGINEER finds Ferodo non-metallic brake blocks outlast cast-iron by as much as five times. They're four times lighter—easier and quicker to fix. Wheel tread profiles are not distorted, and lower operating pressures cut stresses on the brake rigging and wear on pins and bushes.

THE PERMANENT WAY ENGINEER gets longer life from his track. Abrasion by metallic dust is eliminated, and track shocks are reduced.

THE PASSENGERS get a smoother pull-up, free from jolts and jerks.

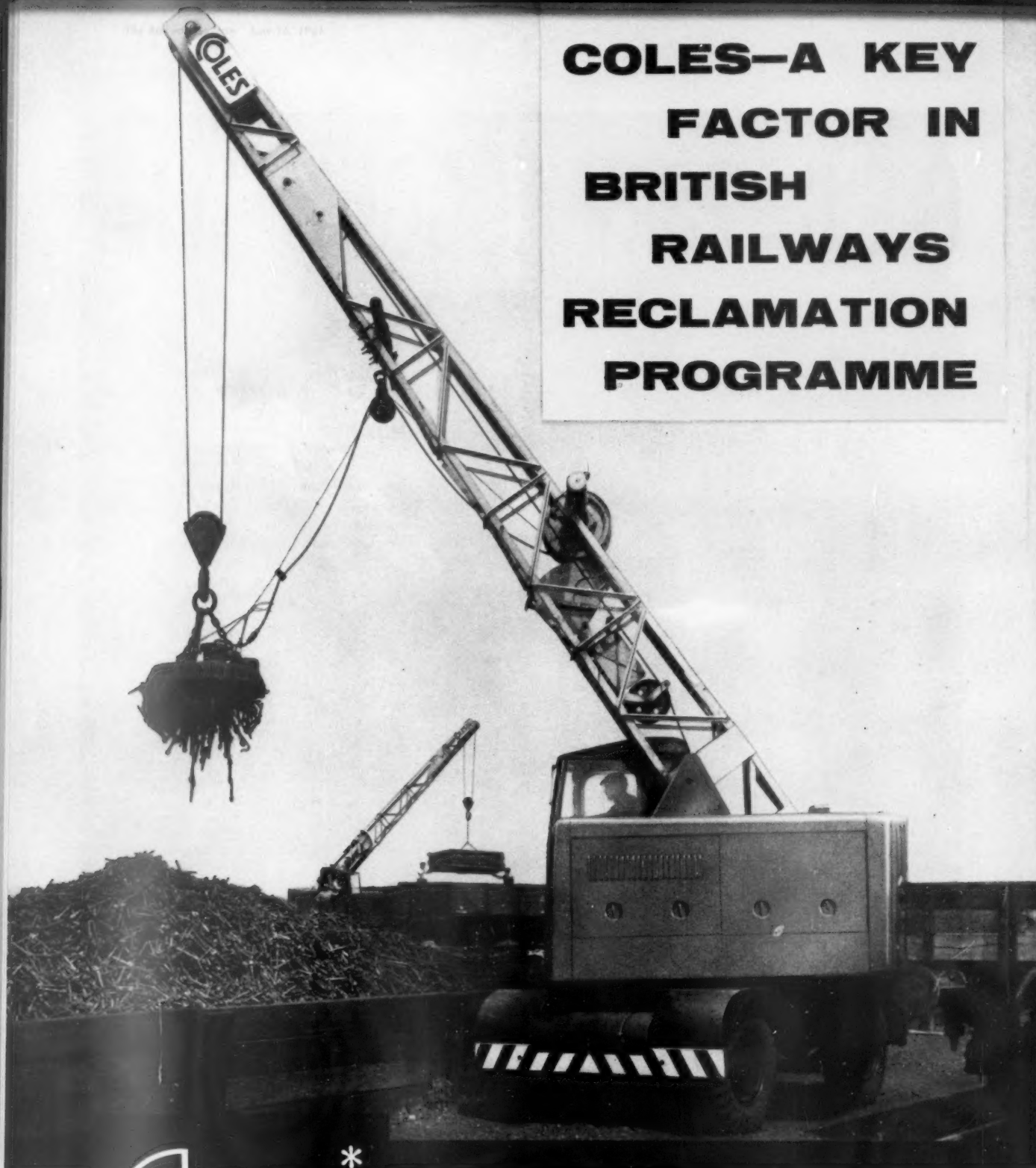
In fact, Ferodo non-metallic brake blocks give better braking at less cost!

FERODO

non-metallic brake blocks

FERODO LIMITED · CHAPEL-EN-LE-FRITH · DERBYSHIRE · ENGLAND
A Member of the Turner & Newall Organisation

**COLES—A KEY
FACTOR IN
BRITISH
RAILWAYS
RECLAMATION
PROGRAMME**



*Registered Trade Mark

100 tons of sleepers a day—7 tons of mixed track fittings an hour . . . the day-by-day performance of a fast-moving pair of 3-ton Coles. Result—substantially reduced costs for the Cambridge Reclamation Depot.

Cut YOUR costs with COLES.

**THE NAME THAT CARRIES WEIGHT
STEELS ENGINEERING PRODUCTS LIMITED**

HEAD SALES OFFICE: 143 SLOANE STREET, LONDON, S.W.1. SALES AND SERVICE: LONDON, BRISTOL, BIRMINGHAM, MANCHESTER, LEEDS, NEWCASTLE, GLASGOW.

G.E.C. 25kV LOCOMOTIVES



This 100 mile/h. 25 kV a.c. locomotive is one of ten which G.E.C. is supplying to British Railways for express passenger and goods trains.


Mechanical parts are made by North British Locomotive Co. Ltd.

rely on the experience of

G.E.C.

THE GENERAL ELECTRIC CO LTD OF ENGLAND • TRACTION DIVISION • BIRMINGHAM 6

375



high
quality
welding
-at low
cost

Equipment designed for fast,
low-cost work on the widest range
of materials . . . the sensational
Saffire for example.
From the full range of Saffire
equipment there's sure to be a
Saffire which can help cut
your production costs; ask any
of our 38 branch offices for
experienced and expert advice.

**THE BRITISH OXYGEN
COMPANY LIMITED**

LIGHT INDUSTRIAL DEPARTMENT
SPENCER HOUSE · 27 ST. JAMES'S PLACE
LONDON S.W.1



REWARD



A substantial and well-deserved REWARD has accrued to the above Company Director for his heroic, dogged, rugged—nay, sensible—decision to obtain from **ASSOCIATED LEAD** all his firm's supplies of **RED LEAD PAINTS and RUSTODIAN CALCIUM PLUMBATE PAINTS.** He now moves in an aura of profit and prestige.

This announcement is issued for and on behalf of

ASSOCIATED LEAD MANUFACTURERS LIMITED

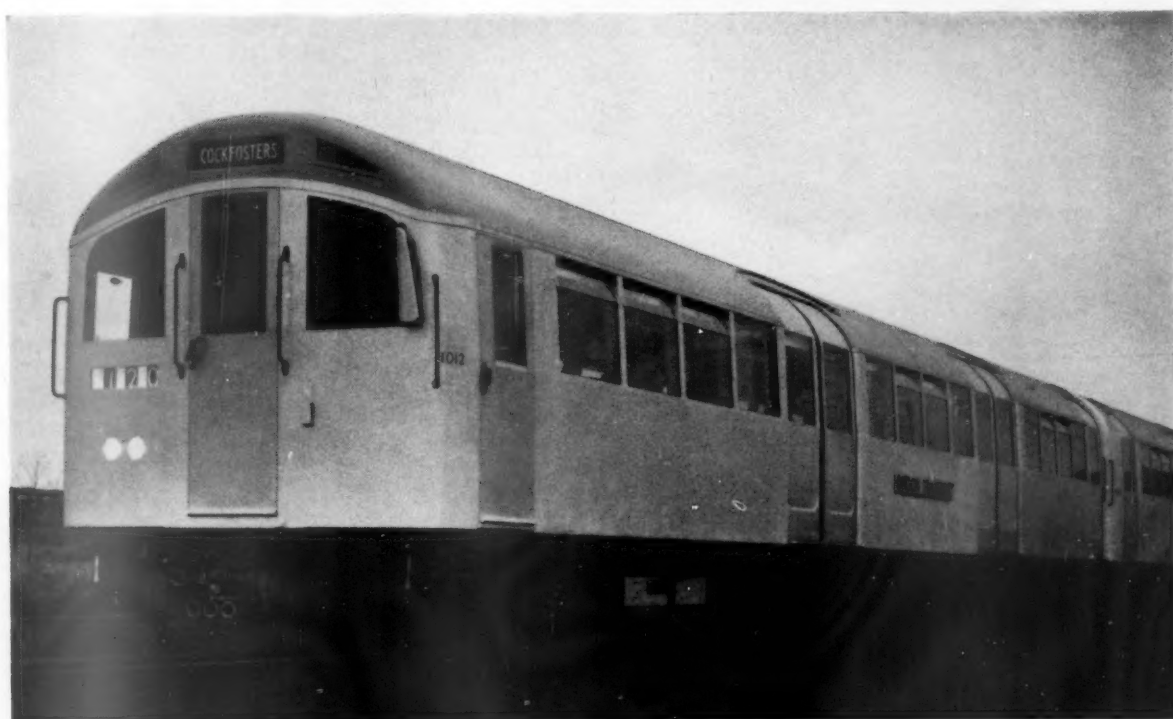
CLEMENTS HOUSE, 14 GRESHAM STREET, LONDON, E.C.2. CRESCENT HOUSE, NEWCASTLE. LEAD WORKS LANE, CHESTER

Export enquiries to: Associated Lead Manufacturers Export Co. Ltd., Clements House, 14 Gresham Street, London, E.C.2





TUBE CARS



FOR PICCADILLY & CENTRAL LINES

Photograph by courtesy of
LONDON TRANSPORT EXECUTIVE

LONDON TRANSPORT

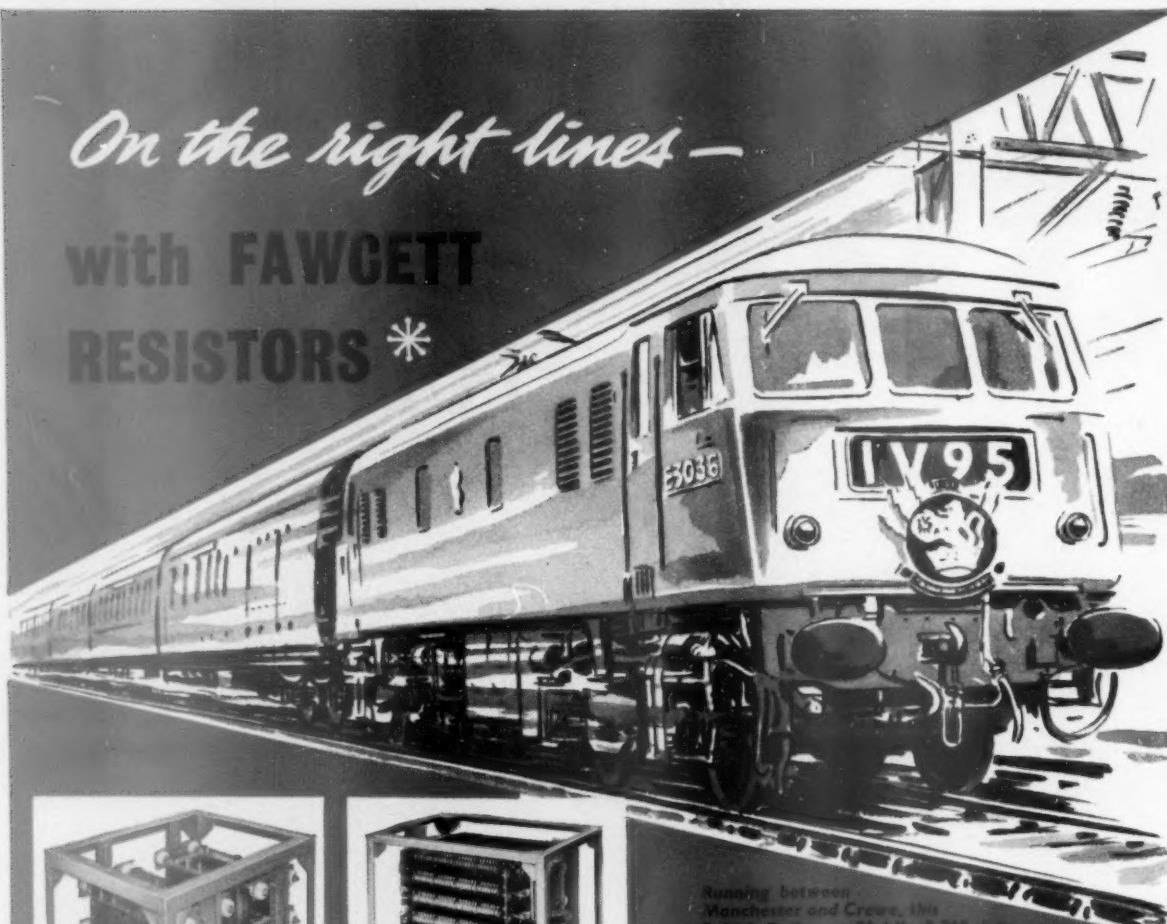
397 cars have been completed against the original contract for 589. An order for a further 450, making 1,039 has now been received.

METROPOLITAN-CAMMELL CARRIAGE & WAGON CO. LTD.

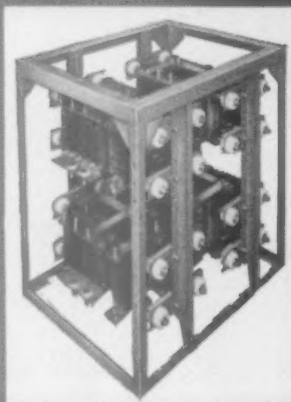
HEAD OFFICE
SALTLEY · BIRMINGHAM 8

LONDON OFFICE
VICKERS HOUSE · BROADWAY · WESTMINSTER S.W.1.

On the right lines —
**with FAWCETT
 RESISTORS ***

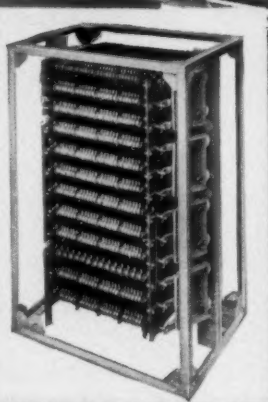


Running between Manchester and Crewe, this British Railways 25 kV, 3,300 h.p. electric locomotive, one of ten supplied by G.E.C., is the first of its type to operate a scheduled passenger service in the British Isles.



FAWCETT F.P. SERVICE RESISTOR
 installed to carry out two main functions:

- a) to act as smoothing resistance and to divert ripple currents from the traction motor main field system. Being virtually non-inductive F.P. Service Resistors are ideally suited for this purpose.
- b) to divert the field current to permit the speed of the locomotive to be increased at predetermined stages.



FAWCETT F.P. HI-TEMP STRIP RESISTOR
 used for tap-changing on the regulating transformer providing safe operation at high temperature with high overload capacity. Skilled design ensures that of the total weight, one half is of active material. Non-corrodible and unbreakable construction.

*** FAWCETT F.P. Hi-Temp Strip and F.P. Service Resistors** were chosen for these new high-speed locomotives and have proved their ability to provide maximum rating with minimum size and weight and long efficient operation under all conditions.

Whatever your resistor requirement — industrial traction or marine — you, too, will be "on the right lines" if you select FAWCETT.

Send us details; our engineers will be pleased to advise you.

Fawcett

FAWCETT PRESTON & COMPANY LTD.
 BROMBOROUGH, CHESHIRE.
 Telephone: ROCK FERRY 6181
 Branch Offices in London and Birmingham



'ON-TIME' ARRIVAL

Brush Type II locomotive with Mirrlees JVST engine draws into No. 6 Platform at King's Cross with the empty stock to form the 5.10 p.m. for Royston...
...The London Commuter knows when he's on to a good thing but as he sits back little thought is spared for the Mirrlees diesel which gets him in on-time. Now, in many parts of British Railways, Eastern Region the story is the same—punctuality and reliability—thanks to Mirrlees diesels.

Mirrlees

diesels

provide the power

MIRRLEES, BICKERTON & DAY LIMITED
HAZEL GROVE • STOCKPORT • CHESHIRE
Tel.: Stepping Hill 1000 (15 lines) Grams.: "Mirrlees, Telex, Manchester"

A member of the Humber Sillitby Group

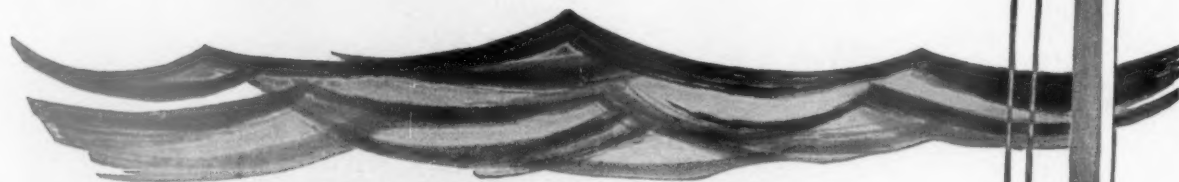
PIONEERS IN

HEAVY-LIFT TRANSPORTATION



BELSHIPS

Over 30 years' specialisation in
the transportation of Railway Rolling Stock
World-wide service
Lifts up to 200 tons



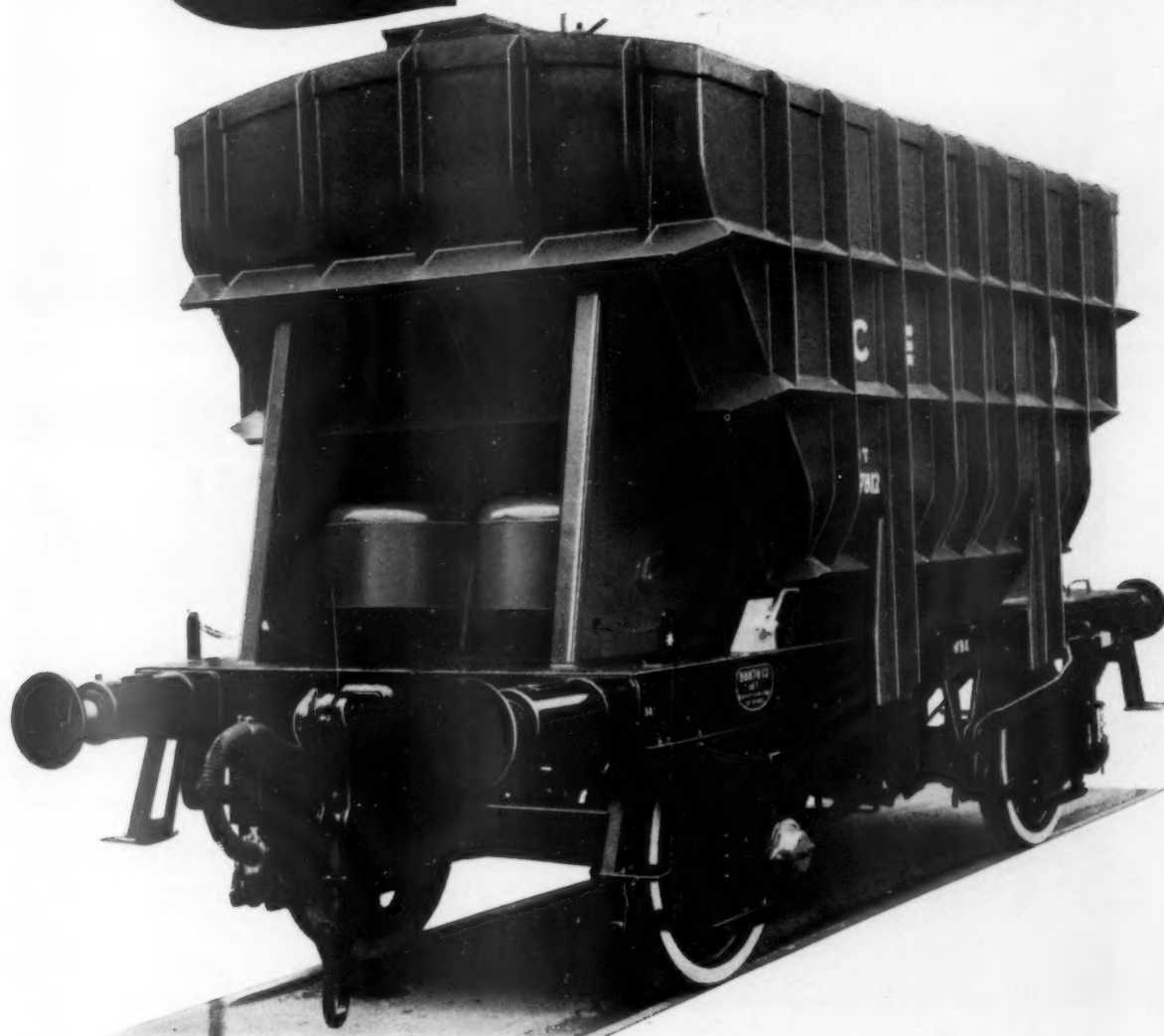
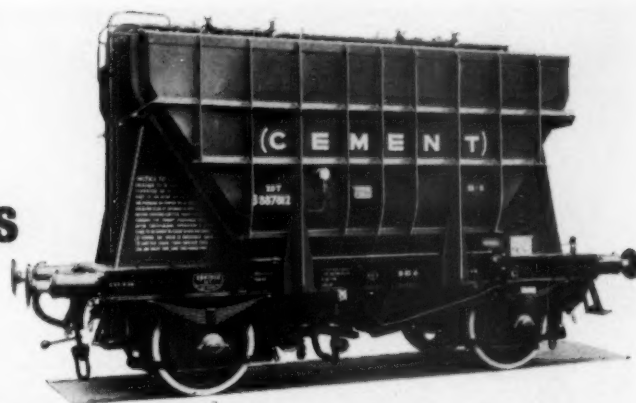
BELSHIPS CO. LTD. SKIBS A/S • OSLO • NORWAY

Managers: **CHRISTEN SMITH SHIPPING CO., Haakon VII's Gate 1 • OSLO • NORWAY**

London Office: **BELSHIPS COMPANY LTD. • Creechurch House • Creechurch Lane • LONDON • E.C.3**

BTC **'Presflo'** **Bulk Cement Wagons**

by **GLOUCESTER**



One of a large contract for 20-ton Cement Wagons built for British Transport Commission. Fitted with discharge equipment and S.K.F. roller bearings. Gauge 4 ft. 8½ ins. Wheelbase 10 ft. 6 ins.

GLOUCESTER RAILWAY CARRIAGE & WAGON CO. LTD., GLOUCESTER · ENGLAND
Telephone: Gloucester 22111
LONDON OFFICE: 1-5 New Bond Street, London, W.1.
Telegrams: Railcar, Gloucester.
Phone: Hyde Park 2956

CONTRACTORS TO THE WORLD'S RAILWAYS SINCE 1892

adlake

TRADE MARK

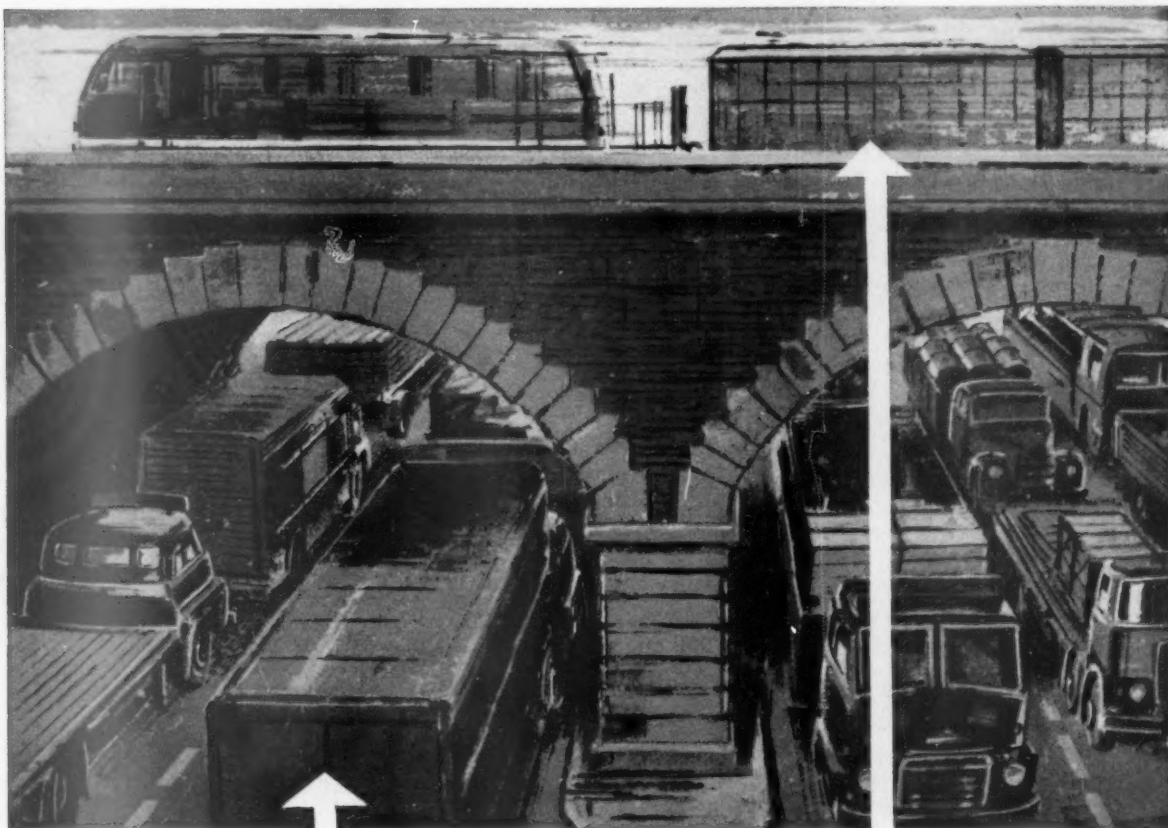
planlift

TRADE MARK

PLANLITE

TRADE MARK

OIL LAMP BURNERS**ELECTRIC AND OIL BURNING
SIGNAL LAMPS****MECHANICAL AND HYDRAULIC
TRACK JACKS****LAMP MANUFACTURING & RAILWAY SUPPLIES LTD.****HEAD OFFICE AND WORKS:- VINCENT LANE, DORKING, SURREY.****Phone: DORKING 4411****JOHN LEVICK****PATENT
WASH BASINS****IN SOLID WHITE NICKEL METAL
OR STAINLESS STEEL****NO SPLASH OR DRIP**
*Easily Cleaned***JOHN LEVICK LTD.****METAL SPINNING WORKS, ALMA STREET, ASTON, BIRMINGHAM****PHONE: ASTON CROSS 4881**



*This lorry... could be up there
if only it were a Roadrailer!*



What have roads got that railways haven't? Door-to-door service on the same vehicle. They also have something else—traffic jams! These can make a potentially fast service into a frustratingly slow one.

The railway's fundamental equipment is the permanent way and on direct hauls it is the cheapest form of overland transport. To neglect its clear-cut advantages on long and medium trunk hauls does not make sense.

Now the Roadrailer gives the obvious

answer. It is a road vehicle that is transferred on to the permanent way in 150 seconds by letting down rail wheels. It can be adapted for any traffic including liquids, timber, cement. It coddles its loads with a suspension so smooth that a threepenny bit has been made to stand on edge at 65 m.p.h.

Feed railheads by road; trunk between railheads by rail. That makes sense. And now the Roadrailer can achieve it as a practical, profitable proposition.

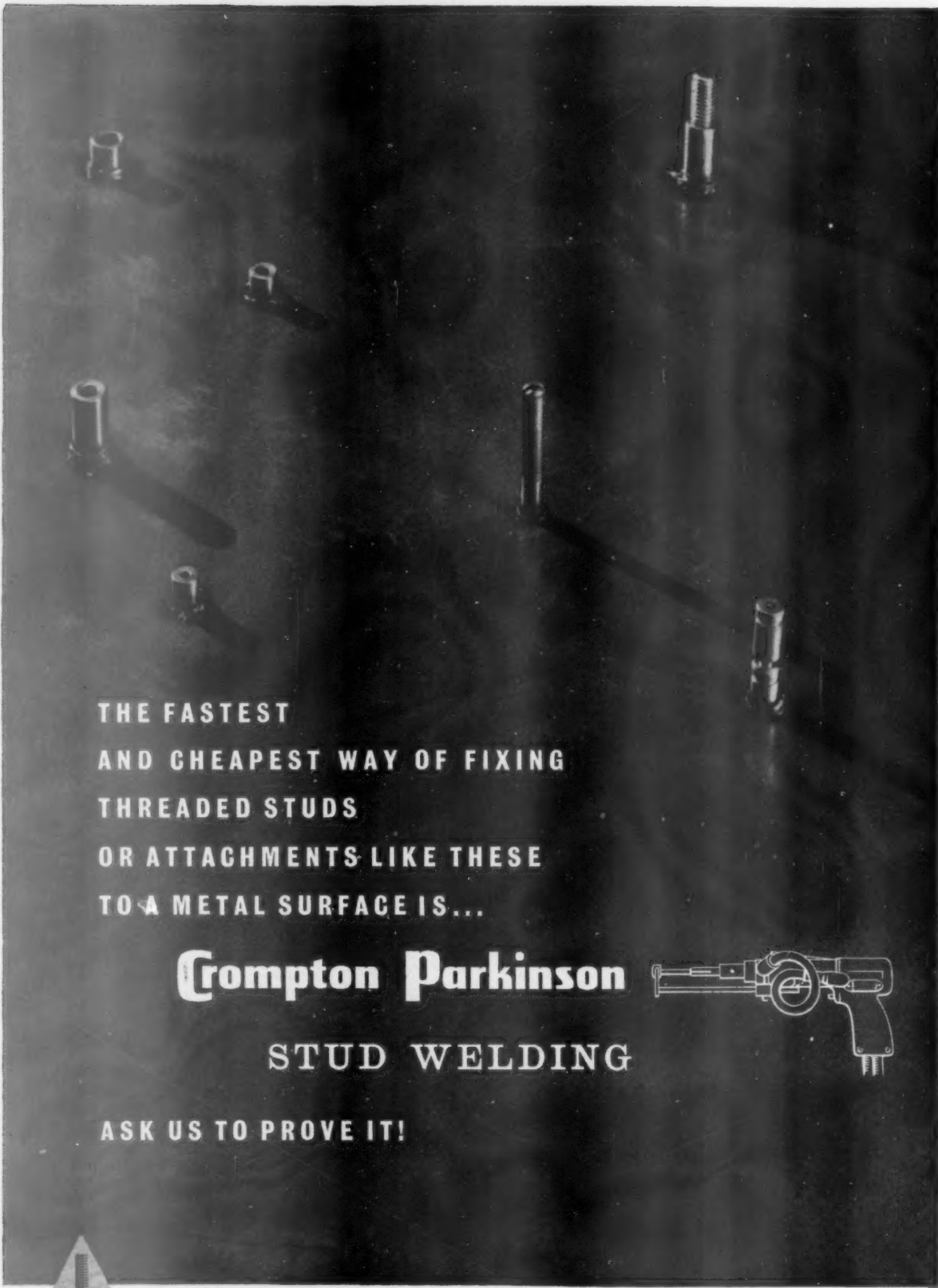


PRESSED STEEL CO. LTD.

*Railway Division,
Linwood Factory, Paisley, Scotland*

LONDON OFFICE: Railway Division, 47 Victoria St., London, S.W.1. HEAD OFFICE: Cowley, Oxford. BRUSSELS OFFICE: 2301/2307 Centre International Rogier, Passage International 6, Brussels 1, Belgium. Manufacturers of car bodies, Prestcold refrigeration equipment, all kinds of pressings and executive aircraft.

150 SECONDS — YOU CAN HAVE THE BEST OF BOTH WORLDS



THE FASTEST
AND CHEAPEST WAY OF FIXING
THREADED STUDS
OR ATTACHMENTS LIKE THESE
TO A METAL SURFACE IS...

Crompton Parkinson

STUD WELDING



ASK US TO PROVE IT!

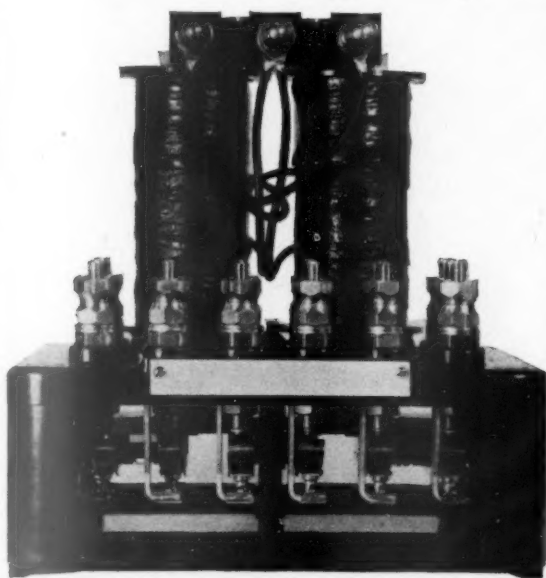


CROMPTON PARKINSON (STUD WELDING) LTD • 1-3 BRIXTON ROAD • LONDON • SW9 • TEL: RELIANCE 7676

TRACTIVE ARMATURE DIRECT CURRENT NEUTRAL TRACK AND LINE RELAYS

TYER'S SIX ARM TYPE G2/6

conforming, in all respects, to the British Standard's Specification No. 1659 of 1950, with all material and workmanship of the highest quality.



Standard coil windings:

Track: 2.25 or 9 ohms.

Line: Class A. & B. 250 & 1000 ohms
or to particular requirements.

Standard contact equipment:

4F 2F/B, 2F 4F/B, 6F/B.

Contact clearances:

	Front	Back
Track & Line Relays Class A.	0.04 in.	0.02 in.
Line Relays Class B.	0.10 in.	0.06 in.

Contacts:

Front 50% silver, 50% graphite.

Arm & Back, fine silver.

Contact resistance:

Carbon to carbon 0.40 ohm.

Carbon to metal 0.18 ohm.

Metal to metal 0.03 ohm.

Casework:

Moulded two-piece unit with four rectangular glass sides, so cased to ensure the contact chamber being moisture-proof.

Height: 8½" Width: 7½" Depth: 7½" Weight: approximately 13-lb.

Terminals:

O.B.A. nut type, to B.S.S. 442 or can be supplied to A.R.A. standards.

Shrouds for terminals also catered for, as also short stems for detachable coupling units.

Terminal Markings moulded in relief:

Coils R1 and R2, A. arm, F. front contact and B. back contacts.

Coils:

Moulded bobbin, non rotatable, black tropical finish.

The Relays can be immunised against the effects of alternating current.

Slow drop-away and slow pick-up features can be provided to suit individual requirements.

Packing:

Cartons designed to contain the unit for supply and storing.

Similar four arm units as Track Relays, Type G2/T and Line Relays

Type G2/L cater for all two, three or four-arm contact requirements.

All relay units can be fitted with detachable terminal tops.

TYER & COMPANY LIMITED

Established 1851

**PERRAM WORKS · MERROW SIDING
GUILDFORD · SURREY**

(Within the organisation of the Southern Area Electric Corporation)

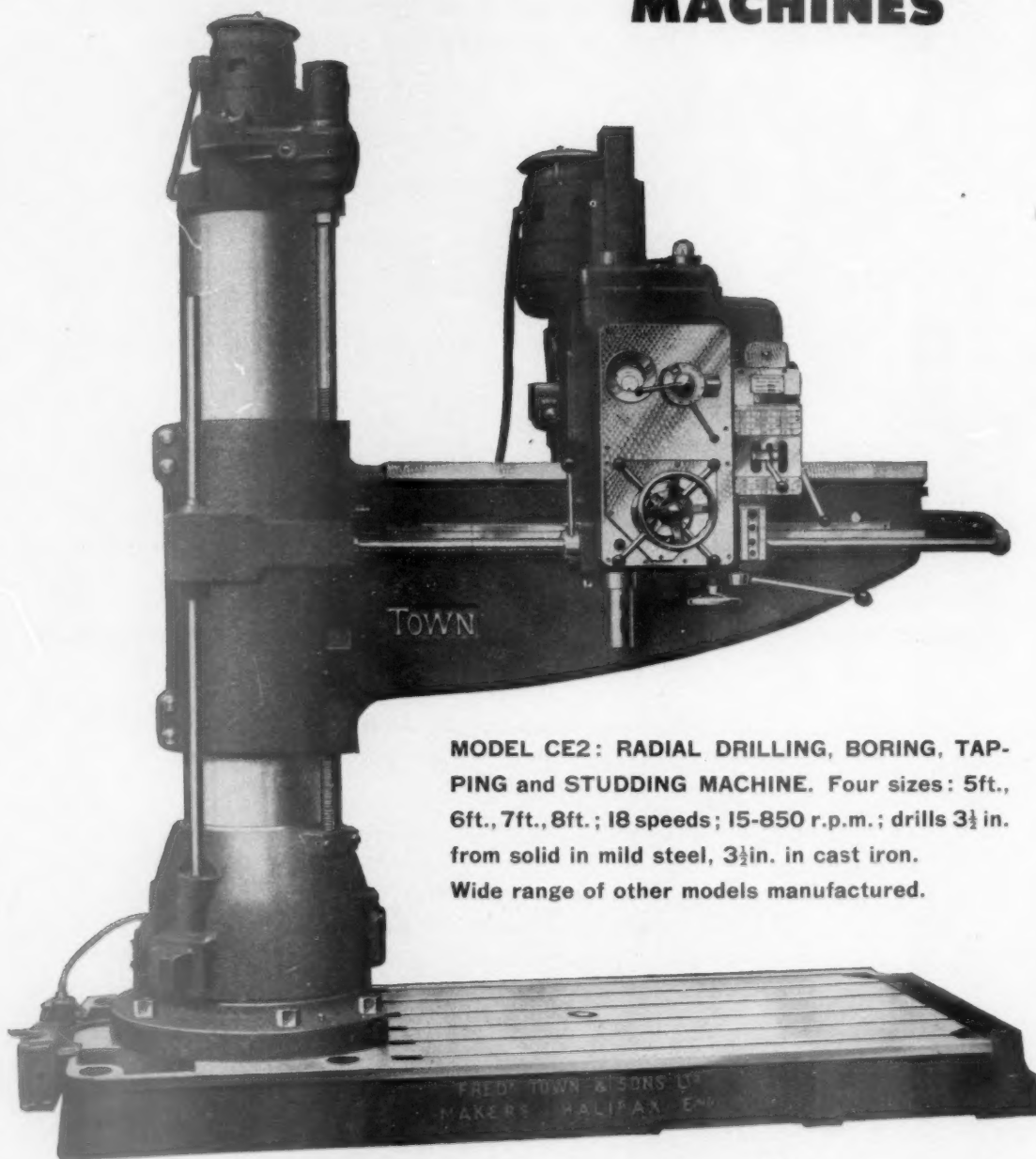


MANUFACTURERS OF
RAILWAY SIGNAL AND TELEGRAPH,
ELECTRONIC AND HUMIDITY CONTROL
EQUIPMENT AND ALL TYPES OF
PRECISION APPARATUS

Telephone: Guildford 2211. Telegrams: Switchmen, Guildford.



RADIAL DRILLING MACHINES



**MODEL CE2: RADIAL DRILLING, BORING, TAP-
PING and STUDDING MACHINE. Four sizes: 5ft.,
6ft., 7ft., 8ft.; 18 speeds; 15-850 r.p.m.; drills 3½ in.
from solid in mild steel, 3½ in. in cast iron.
Wide range of other models manufactured.**

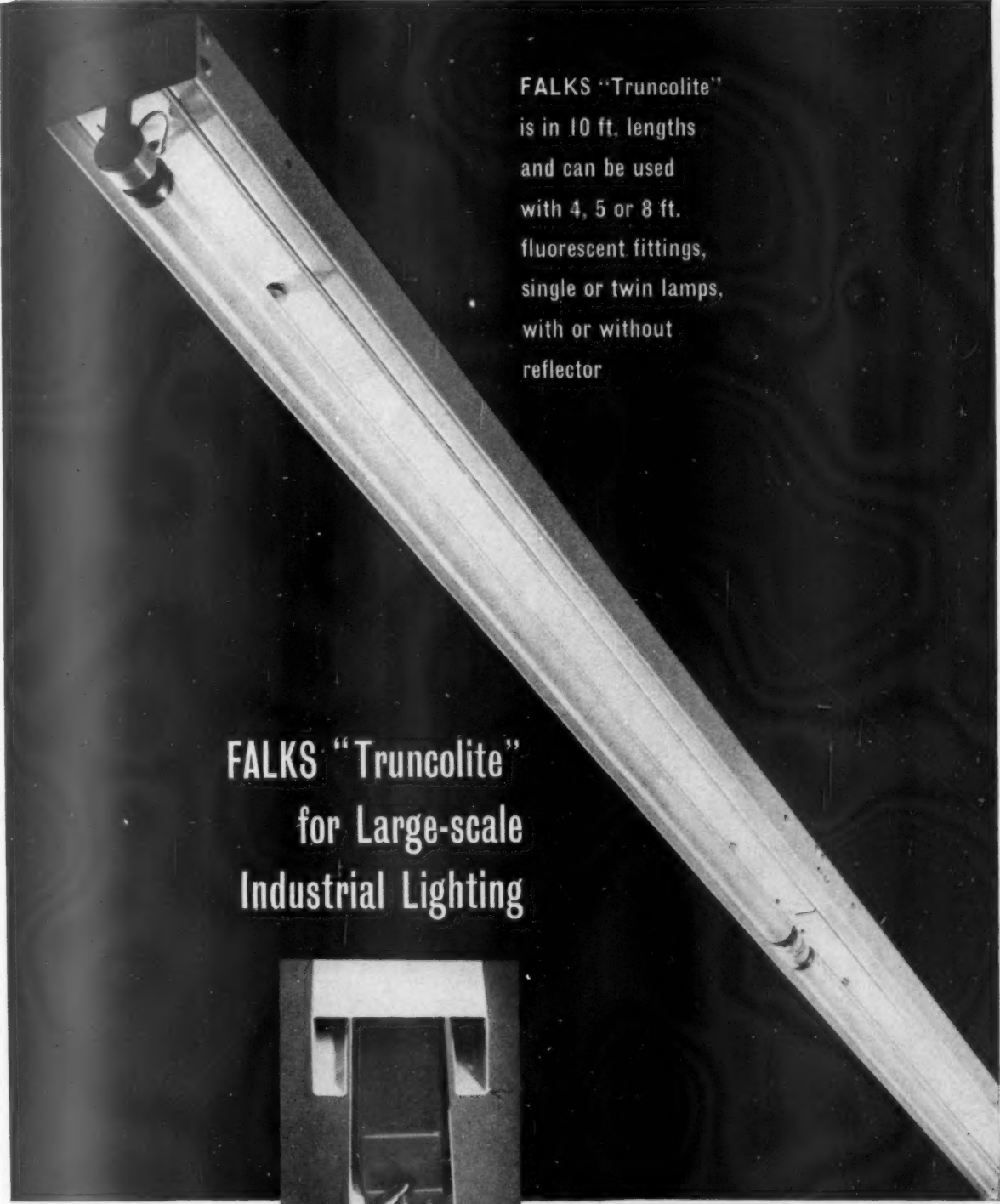
FRED[®] TOWN & SONS LTD

Makers of high-class Drilling Machines for 58 years.

HALIFAX • YORKS

PHONE: HALIFAX 60373/4

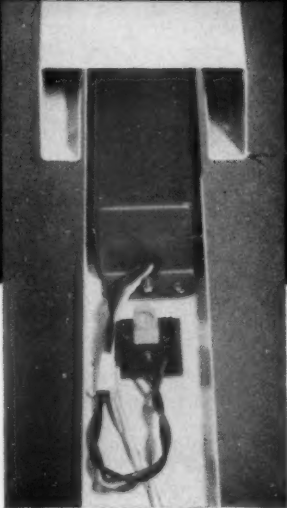
T.20



FALKS "Truncolite"

is in 10 ft. lengths
and can be used
with 4, 5 or 8 ft.
fluorescent fittings,
single or twin lamps,
with or without
reflector

FALKS "Truncolite" for Large-scale Industrial Lighting



FALKS "Truncolite" provides you with an infinitely extensible and widely adaptable base for fluorescent lighting schemes using continuous trunking. "Truncolite" is ideal for all large-scale industrial lighting applications.

FALKS, the long established lighting specialists, designers and manufacturers of all types of fittings. Lighting Engineering Services freely available.

We welcome your inquiries

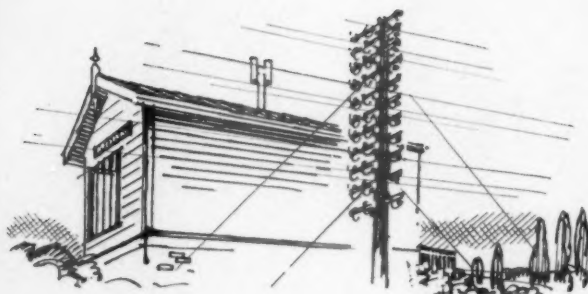
FALKS
FALK, STADELMANN & CO. LTD

**THERE'S A MODERN FALKS
FITTING FOR EVERY PURPOSE**

91 FARRINGTON ROAD, LONDON, E.C.1. Tel: HOLborn 7654. London Showrooms: 20/22 MOUNT STREET, PARK LANE, W.1. Tel: MAYfair 5671/2
AP 124

STC

CARRIER SYSTEMS FOR RAILWAYS



STC all-transistor carrier systems are serving British Railways on a number of busy routes. One such system (STO-C) provides for 3 Telephone circuits and 6 F.M. telegraph channels over one pair of wires in the frequency band 6.0-31.5 kc/s. Wide band circuits are employed and out-of-band signalling for ringdown or dialling is inbuilt. Equipment for two terminals can be mounted on one 9 ft rackside.

TEMPLE MEADS (BRISTOL)

The illustration shows a 6 ft terminal rackside for the installation of STO-C all-transistor equipment for the Western Region at Temple Meads.



Standard Telephones and Cables Limited

Registered Office: Connaught House, Aldwych, London W.C.2

TRANSMISSION SYSTEMS DIVISION: NORTH WOOLWICH · LONDON · E.16



Photograph: courtesy of Bell Aircraft Corp.

Early detection and speedy action lessen the damage done by fire. Helicopters are ideal for forest patrols: to spot the beginnings of fire and to rush men in before the blaze can spread.

DOCKERS' PAINTS have given sound protection to rolling stock, vehicles and buildings on the transport systems of the world in all weathers for more than 70 years. DOCKERS are also pioneers in the development and production of the very specialised finishes for aircraft.

HAVE YOU A PROBLEM OF PROTECTION?

Technicians at our Research Laboratories will advise you on any aspect of paint technology, including the choice and methods of application of DOCKERS' PAINTS.

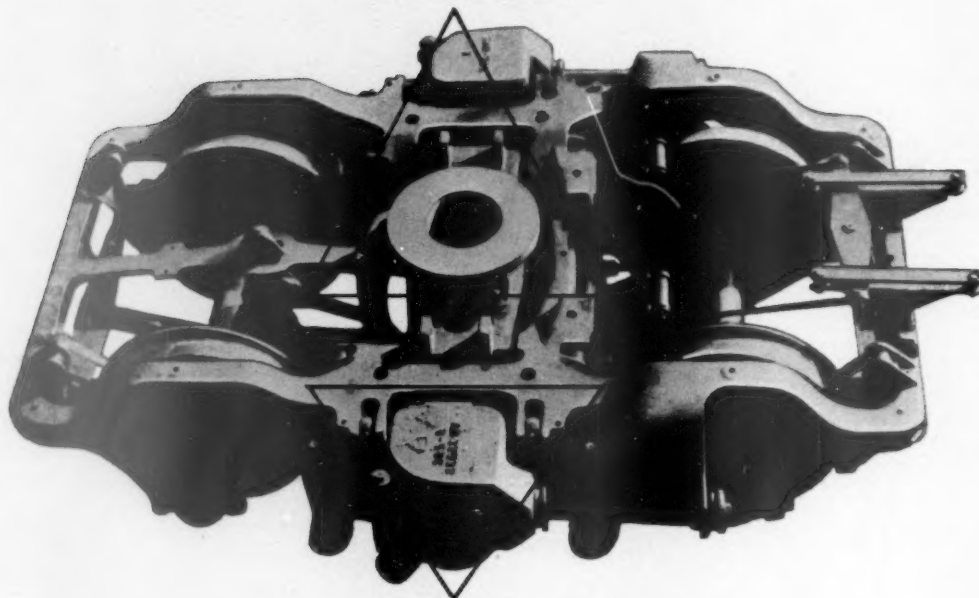
Protection

DOCKERS' PAINTS

Tested by Time in every Country under the Sun
Docker Brothers • Ladywood • Birmingham 16 • England
Makers of Paints, Lacquers and Varnishes for Every Purpose

LARGE CENTRAL BEARING

Eliminates bogie shimmy.
Increases wheel mileage.
Eliminates side bearings.

**OUTSIDE SWING HANGERS**

Inspection and maintenance
are quick and easy.
Broader spring base contrib-
utes to better riding.

YOU CAN SEE THE DIFFERENCE IN COMMONWEALTH PASSENGER BOGIES

The large central bearing in Commonwealth passenger coach bogies eliminates side bearings and bogie shimmy, and also increases wheel mileage.

The outside swing hangers provide a broader spring base which contributes to a smoother passenger ride, and they are located so that inspection and maintenance are quick and easy.

These are two of the superior features which have made Commonwealth cast steel bogies known and used around the world on local and inter-city transit systems and railways. A wide variety of designs is available to fit your need, each design based on General Steel's 50 years of experience in designing, making and service-testing passenger bogies.



Commonwealth products are furnished completely machined and are designed for all track gauges by

GENERAL STEEL INDUSTRIES, INC.

Granite City, Ill. • Eddystone, Pa. • Avonmore, Pa., U.S.A.

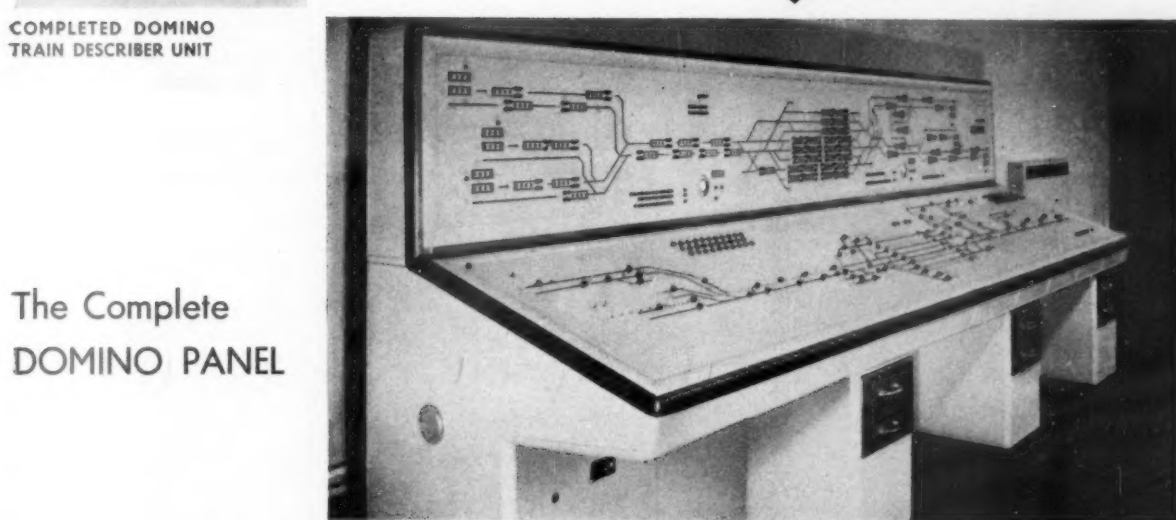
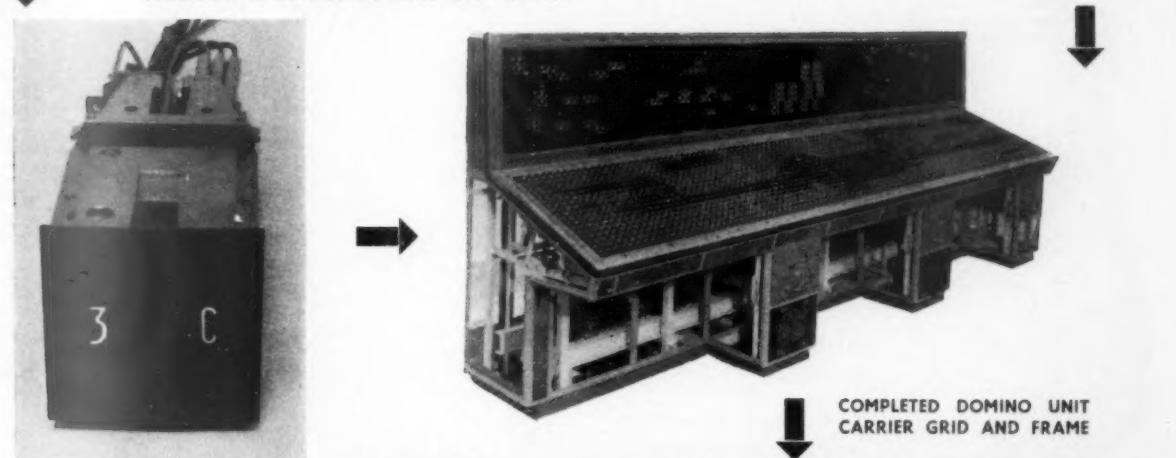
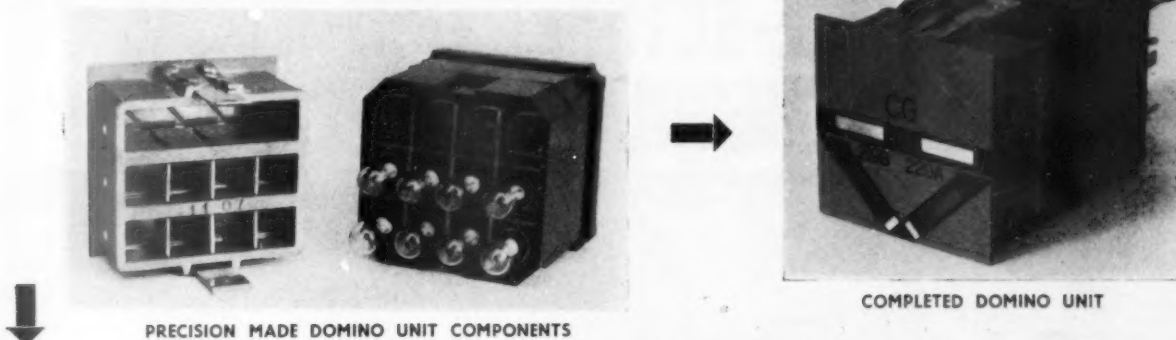
Subsidiary: St. Louis Car Company, St. Louis, Mo.

Commonwealth Products are produced under license in Australia, Canada, England and South Africa

COMMONWEALTH SALES CORPORATION

International Representatives: Granite City, Illinois, U. S. A. Telegraph: "Comsteelco"

INTEGRA SIGNALLING



The Complete
DOMINO PANEL

By kind permission of Western Region, British Railways

THE MEMBERS OF THE PANEL GAME!

HENRY WILLIAMS LTD

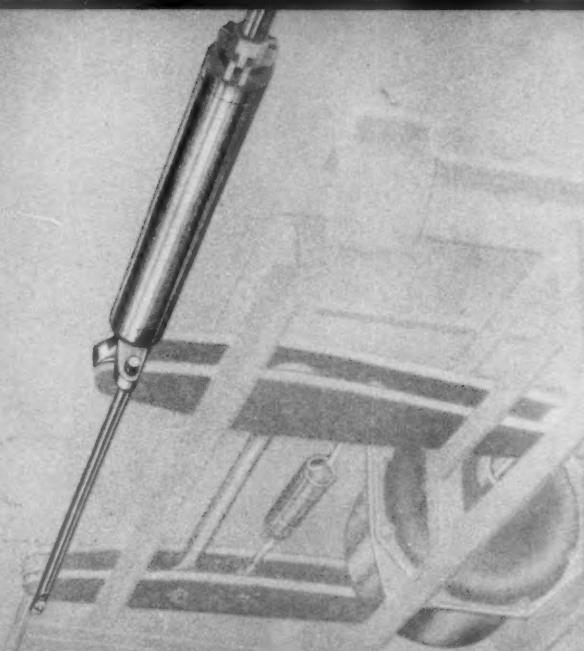
Telephone : RICKMANSWORTH 4321



ELECTRIC SIGNALLING DEPARTMENT

WATFORD

SAB DOUBLE-ACTING RAPID-WORKING BRAKE REGULATOR TYPE DRV



IN MORE THAN 50 COUNTRIES

Although the productions of the SAB Company cover a wide range of empty/loaded braking devices, the product most closely associated by railway engineers with the symbol SAB is the double-acting, rapid-working SAB Brake Regulator.

SAB Brake Regulators have been delivered to leading Railways in more than 50 countries all over the world. In most of these countries, SAB Brake Regulators have been adopted as a standard component of the brake equipment. They have gained a reputation for efficiency and reliability, resulting in an ever increasing number of installations on all types of railway vehicles.



BRAKE REGULATOR TYPE DRV

The most advanced member of the SAB slack adjuster family is the fully automatic, double-acting, rapid-working Brake Regulator Type DRV, the result of more than 40 years of specialised experience of automatic slack adjustment.

The DRV regulator is built into the brake rigging as part of a pull rod. It rapidly takes up or pays out slack, thus maintaining correct brake block clearances. In addition it contributes to easier replacement of worn brake blocks, no manual adjustment being required after the operation. The DRV Brake Regulator also makes it possible to use a simple mechanical empty/loaded braking device.



TECHNICAL ASSISTANCE

Whenever brake slack adjustment and empty/loaded braking problems require an effective solution, it is advantageous to consult SAB.

The SAB Company has built up an important service organisation which, with its expert knowledge, is ready to deal with any problem relating to brake rigging and brake installation for all types of railway vehicles.

The SAB Service Engineering Department checks proposed brake rigging designs and provides detailed installation drawings as a service to customers. It also assists whenever necessary at the actual mounting on the vehicle.

BROMSREGULATOR

MALMÖ — SWEDEN



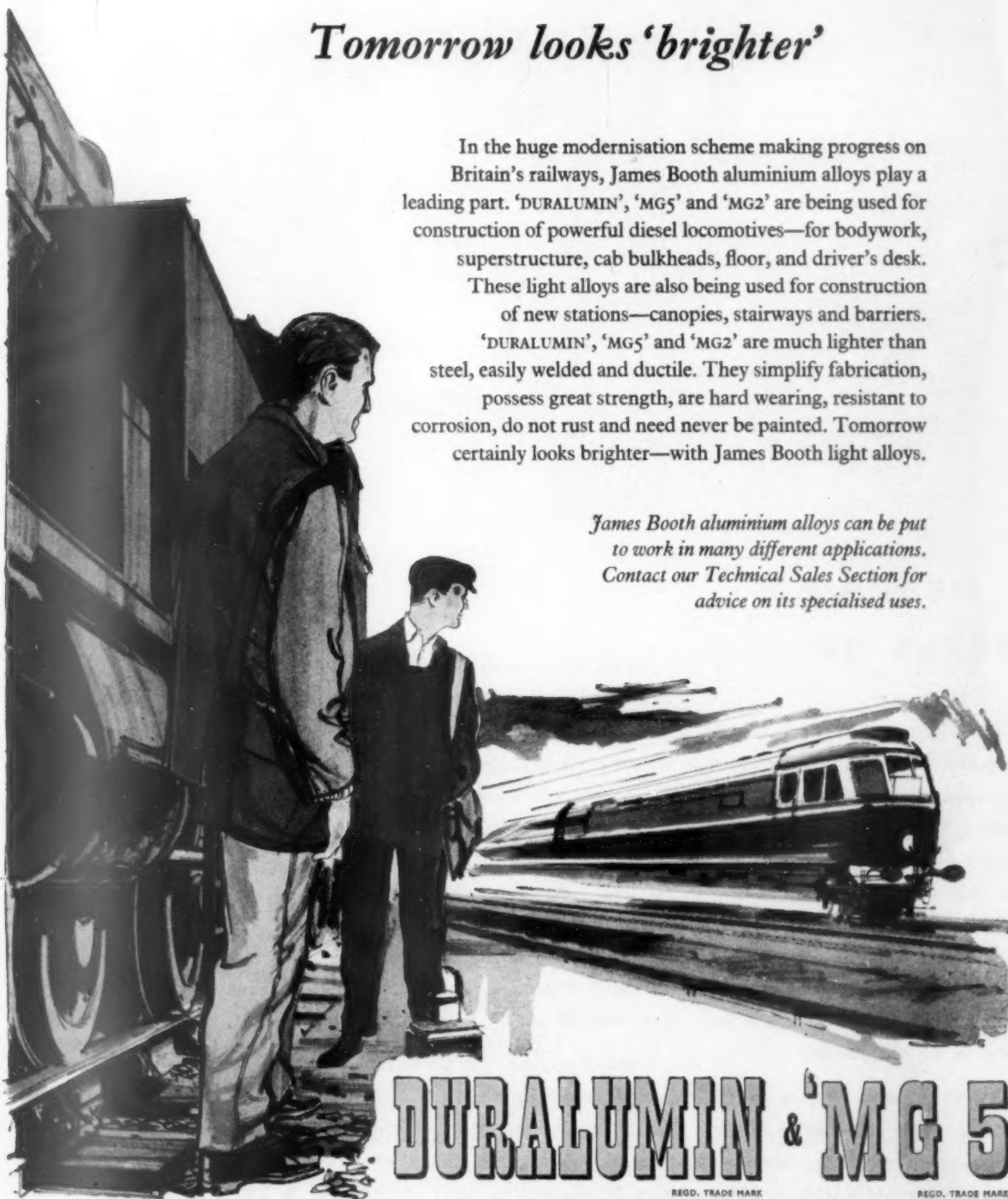
Tomorrow looks 'brighter'

In the huge modernisation scheme making progress on Britain's railways, James Booth aluminium alloys play a leading part. 'DURALUMIN', 'MG5' and 'MG2' are being used for construction of powerful diesel locomotives—for bodywork, superstructure, cab bulkheads, floor, and driver's desk.

These light alloys are also being used for construction of new stations—canopies, stairways and barriers.

'DURALUMIN', 'MG5' and 'MG2' are much lighter than steel, easily welded and ductile. They simplify fabrication, possess great strength, are hard wearing, resistant to corrosion, do not rust and need never be painted. Tomorrow certainly looks brighter—with James Booth light alloys.

James Booth aluminium alloys can be put to work in many different applications. Contact our Technical Sales Section for advice on its specialised uses.



DURALUMIN & 'MG 5'

REGD. TRADE MARK

REGD. TRADE MARK

JAMES BOOTH ALUMINIUM LIMITED · KITTS GREEN · BIRMINGHAM 33 · Telephone: STECHFORD 4020

Extrusions, large forgings, plate, sheet, strip and tubes in light alloys

JBG/BI

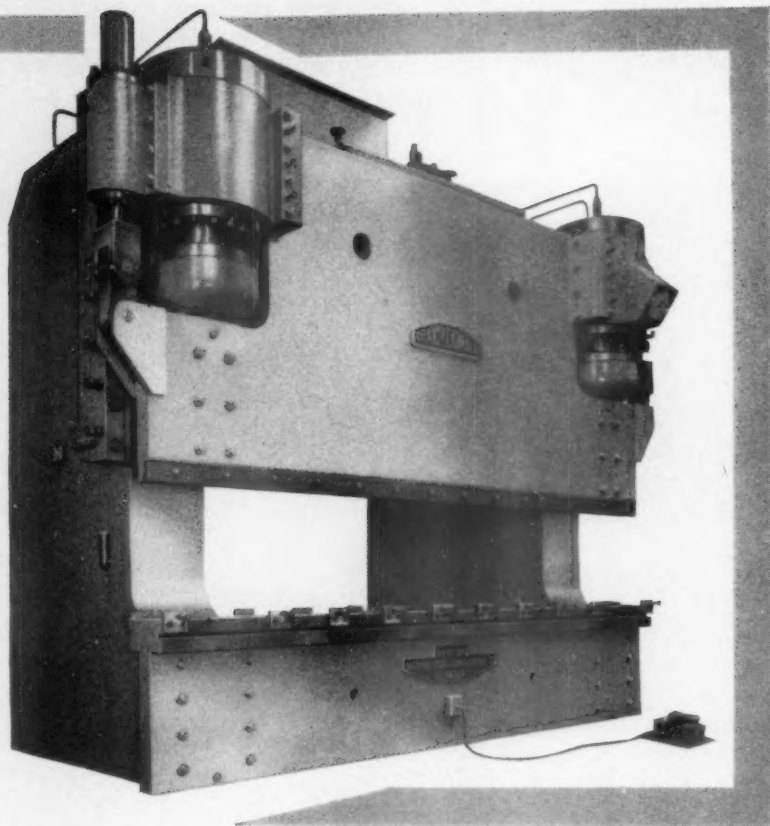
C



HYDRAULIC PRESS BRAKES

The illustration shows one of our larger machines and its compact arrangement will be noted. The smaller machines have all-welded steel frames, whilst these larger sizes are built from massive steel fabrications bolted together. In both cases the slab forming the bed is checked on to the housings, so that the load is not transferred through the welding or the bolts, as the case may be.

Special attention is paid to the guiding of the slide and the guide members are very long, additional guides being provided at the top of the slide. All guides have adjustable gibs.



The hydraulic system is the result of very careful development work and lasting reliability and accuracy are ensured. The slide alignment control is particularly sensitive. High approach speed is provided with a slower working speed, to allow fast but safe operation. The pump is arranged to idle at top stroke. We strongly recommend the installation of our Automatic Control which provides seven different operating sequences.

Standard machines of the hydraulic type (we also build mechanical Press Brakes) are available up to 500 tons capacity and larger machines can often be designed to meet special requirements. Die lengths up to 18' 0"

are normal and extensions can be provided at either or both ends of slide and bed.

SCOTTISH
MACHINE TOOL
CORPORATION LTD.

17 Lynedoch Crescent
Glasgow C.3.

DOUGLAS 6586/9

Lion House, Red Lion Street, Richmond, Surrey
RICHMOND 7667/9

256 Moseley Road, Birmingham 12
CALTHORPE 2541

The Building Centre, Brunswick Terr., Leeds 2
LEEDS 25250

MILLERS' OILS

JOHN W. MILLER & SON LTD.
Brighouse · Yorkshire · England
Tel : Brighouse 1047 (3 lines)

NEWS SHEET

Greatly increased life of bogie suspension unit with **BLACK-MOLY**

REMARKABLE REPORT FROM
BRITISH RAILWAYS, WESTERN REGION



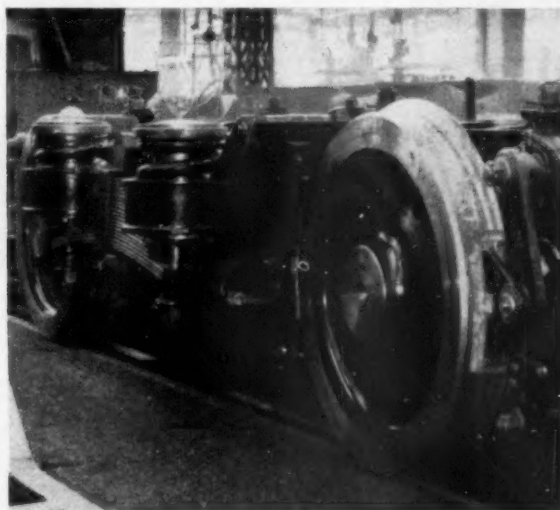
★ LUBRICANT GRADES USED WERE:

BLACK-MOLY AEROSOL
BLACK-MOLY PASTE
BLACK-MOLY M.P. 'Q' GREASE

**POST THIS COUPON
FOR FULL DETAILS
OF BLACK-MOLY**

BLACK-MOLY

is the registered trade mark of
JOHN MILLER & SON LTD · BRIGHOUSE · YORKSHIRE · ENGLAND



Severe scuffing had been experienced on the insides of coil spring guides on Diesel Locomotives, caused by heavy metal to metal contact. Tests were commenced using BLACK-MOLY Molybdenised Lubricants, and after complete treatment these Bogies were put back into service.

The same Bogies ran 175,000 track miles before general overhaul, whereupon the suspension units were found to be in excellent condition and with considerably less wear than ever before.

This treatment with
BLACK-MOLY
is now standard procedure in the Western Region

To: JOHN MILLER & SON LTD · BRIGHOUSE · YORKSHIRE

WITHOUT OBLIGATION send me further details of
BLACK-MOLY Molybdenised Lubricants. Ask your representative to
arrange an appointment*

Name

Company

Address

Telephone

Position in Firm

* Delete as required.

RG2

JACKSON

THE NAME THAT HAS CONSISTENTLY
TYPIFIED THE BEST IN TAMPING EQUIP-
MENT FOR MORE THAN 40 YEARS

*Let us help you to the best
solution of your tamping problems.*

1 JACKSON TRACK MAINTAINER

For both putting up and maintaining track of finest, longest-lasting quality at minimum cost, this is the finest tamping machine money will buy. Powerful vibratory action and complete push-button control make it exceedingly fast. It's overwhelmingly first choice of U.S.A. railways. Available in U.S.A. standard and wider gauges.

2 JACKSON UNIVERSAL

An excellent production tamper which rapidly produces complete consolidation of ballasts up to 3" in diameter in proportionate out-of-face raises. Highly efficient in tamping hanging ties or sleepers. Entirely push-button operated. Jacks and automatic spacer for double joint ties optional. Available in all standard gauges from meter to widest.

3 JACKSON MONORAIL

A complete tamping machine ideal for spotting and smoothing, secondary programs and all yard track maintenance. Utilizes powerful "Maintainer" tamping units. Traveling, indexing and workhead are all hydraulically controlled. All standard gauges.

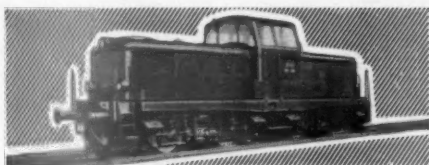
4 JACKSON HAND TAMPERS

Vibratory-electric . . . operated from portable power plant serving 4 tampers. Universally used in low lift and smoothing work as well as major ballast insertion operations. Adjustable handles and interchangeable tamping blades make them quickly adaptable to all workers and tamping requirements.

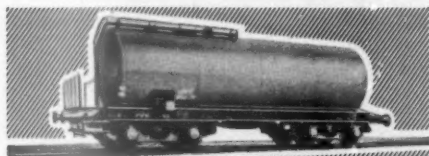
Write, wire or cable for complete information

JACKSON VIBRATORS, INC.
LUDINGTON, MICHIGAN U.S.A.





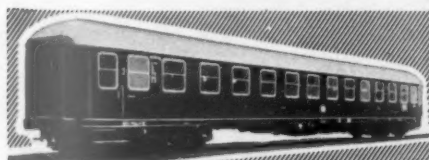
Diesel locomotive of the Danish State Railways,
built by A/S Frichs, Aarhus



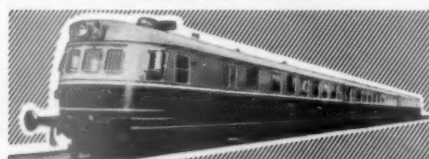
Tank wagon of the Iranian State Railways,
built by Linke-Hofmann-Busch, Salzgitter Watenstedt



Passenger coach of the Swedish company TGOJ,
built by Kockums, Malmö



Express train coach of the German Federal Railways,
built by Rathgeber, Munich

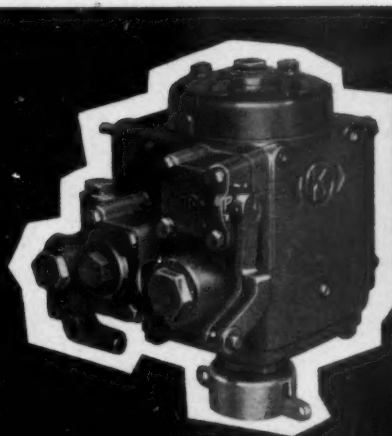


Railcar train of the Norwegian State Railways,
built by A/S Strømmens Værksted, Strømmens



Single-engined railbus of the British Railways,
built by Waggon- und Maschinenbau GmbH, Donauwörth

Knorr KE Type Air-Brakes for all Rail Vehicles



This **KE** universal triple valve

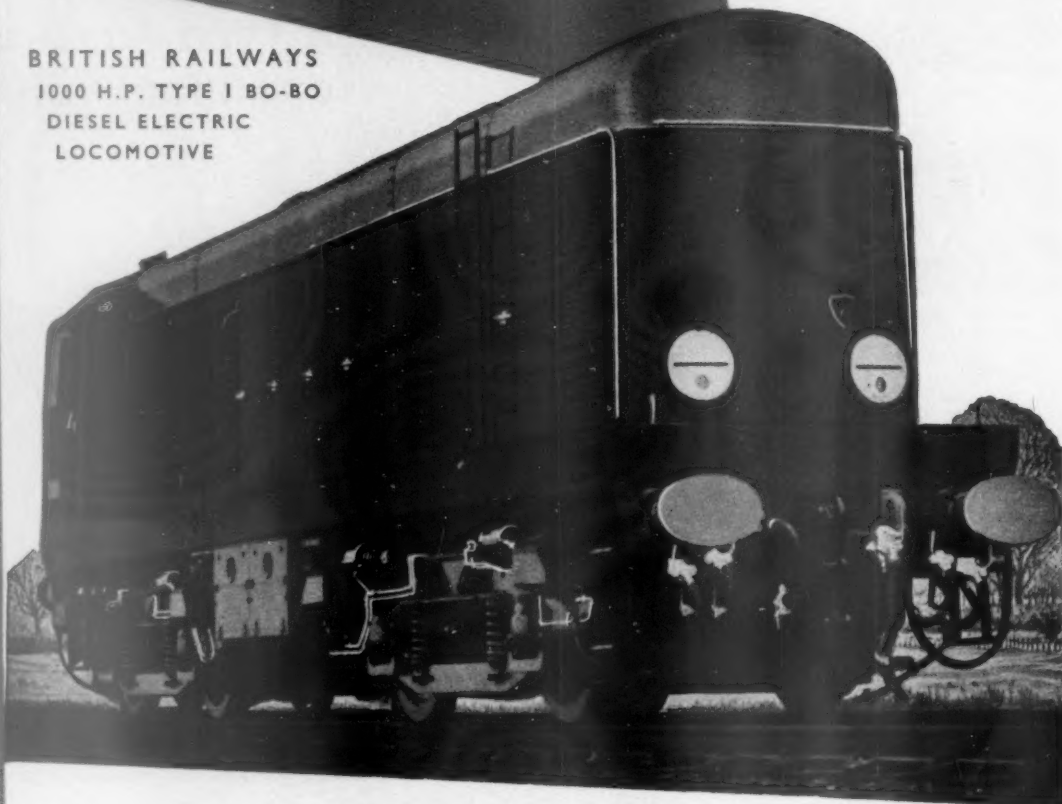
forms the basis of the brake equipment for all types of rolling stock: locomotives, passenger coaches and goods wagons as well as railcars and railbuses. By the attachment of accessory components the action of the valve can be extended to meet the highest demands. The Knorr KE air-brake offers the maximum degree of security and economy. Up to now KE brakes have been supplied to 28 countries in the world.



KNORR-BREMSE GMBH MUNICH W. Germany

Manufacturers and Agents in the United Kingdom:
Laycock Engineering Ltd. Victoria Works Millhouses, Sheffield 8

BRITISH RAILWAYS
1000 H.P. TYPE 1 BO-BO
DIESEL ELECTRIC
LOCOMOTIVE



50 OF THESE LOCOMOTIVES ARE NOW IN SERVICE ON BRITISH RAILWAYS (AND A FURTHER 78 BUILDING). CONSTRUCTED BY THE ENGLISH ELECTRIC CO. LTD., VULCAN FOUNDRY LTD., AND MESSRS. ROBERT STEPHENSON & HAWTHORNS LTD., FOR MIXED TRAFFIC SERVICE. THEY ARE EQUIPPED WITH—

METCALFE-OERLIKON
PATENTED
AIR AND VACUUM BRAKE EQUIPMENT

Manufactured at the Romiley and Dukinfield Works of

DAVIES & METCALFE LTD
ENGINEERS, ROMILEY • Tel.: WOO 2626 (3 LINES)

MAKERS OF MODERN AIR BRAKE EQUIPMENT AND ENGINEERS
TO THE LOCOMOTIVE INDUSTRY SINCE 1870



FOR EFFICIENT PERFORMANCE
IN TRAIN OPERATION

CLASS A-22-XL CLASS RF-333

W. H. MINER, INC.
CLASS A-22-XL
CLASS RF-333
APPROVED 1958



MINER®

CLASS A-22-XL FRICTION DRAFT GEAR



The Miner Class A-22-XL Friction Draft Gear performs a vital service in the economic operation of freight trains. The gear is installed in a 24 $\frac{3}{8}$ " gear pocket.

CLASS RF-333 DRAFT GEAR

The Miner Class RF-333 Draft Gear is a powerful shock absorber which effectively reduces pressures resulting from car impacts. The ultimate in protection for cars with 24 $\frac{3}{8}$ " pockets.

W. H. MINER, INC. CHICAGO

OFFICE OF FOREIGN OPERATIONS

1212 Pennsylvania Building

425 Thirteenth St., N. W.

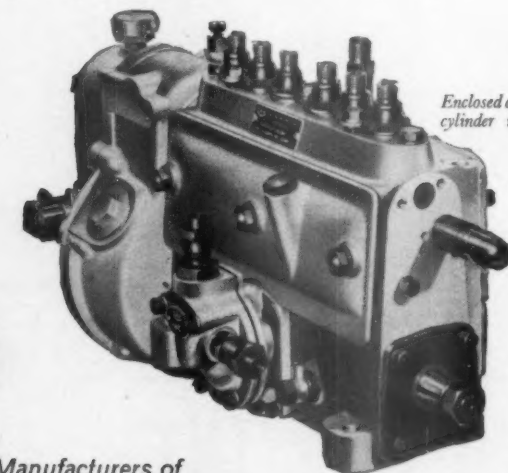
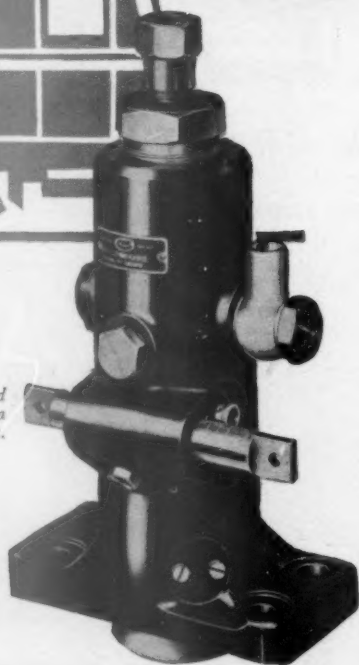
Washington 4, D. C., U. S. A

FUEL INJECTION EQUIPMENT

FOR EVERY TYPE OF DIESEL



*Single flange mounted
injection pump for a
main line locomotive.*



*Enclosed camshaft, multi-
cylinder injection pump.*



The World's Largest Manufacturers of

FUEL INJECTION EQUIPMENT

C.A.V. LIMITED, ACTON, LONDON, W.3

SOUTH AFRICAN RAILWAYS RHODESIA RAILWAYS BENGUELLA RAILWAYS CHEMINS DE FER DE LOU-DE FER DE L'EST-AFRICAIN PORTUGAIS FRANCO-ETHIOPIENS CHEMINS DE TANGA CHEMINS DE FER DU CONGO OTRACO UNION MINIERE DU HAUT POLDVILLE CHEMINS DE FER DE MINS DE FER DU SUD DE L'INDO-CHINE CHEMINS DE FER DE L'INDE CHEMINS CHEMINS DE FER DE LA PROVINCE DE GASTA & BOLIVIAN RAILWAYS THE WAYS THE BRAZIL RAILWAYS CY SAO PAULO RIO GRANDE CIE DES DE L'EST BRESILIEN CIA PAULISTA DE NOROESTE DO BRAZIL ARARAQUARA DE DO NORTE E.F. RIO GRANDE DO POLDINA RY BELGO-MINEIRA CHEMINS DE LIEN NITRATE RAILWAYS F.C. DE ARICA A LA PAZ F.C. DE ARICA A LA PAZ F.C. DE ANTOFAGASTA & BOLIVIA STE NATIONALE DES CHEMINS DE FER EN COLOMBIE F.C. DE ANTIOQUIA COSTA-RICA STATE RAILWAYS FERROCARRIL AL PACIFICO PERUVIAN CORPORATION STE NATIONALE DES CHEMINS DE FER BELGES STE GENERALE METALLURGIQUE DE HOBOKEN S.A. ESPERANCE LONGDOZ S.A. COCKERILL-OUNGREE HAUTS - FOURNEAUX D'YMUIDEN STE DE NOSSI - BE EMPRESA AGRICOLA CHICAMA LIMITADO COMPAGNIES PRIVEES DIVERSES ARBED SOUTH AFR.

The SASKOP-PATENT COUPLER which has been standardized on the railroads of the

SOUTH AFRICAN RAILWAYS, is basically an ATLAS coupler studied and designed by the

USINES EMILE HENRICOT

Only after very accurate and exhaustive tests and comparisons with other types, this very important Railway Company has chosen it as the one corresponding best to their requirements.

ASIA RAILWAYS TRANS-ZAM- WAYS NYASALAND RAIL- RENÇO-MARQUES CHEMINS CIE DES CHEMINS DE FER FER DU BAS-CONGO AU KA- SUPERIEUR AUX GRANDS LACS KATANGA PORT DE LEO- L'ETAT INDONESIEN CHE- CHEMINS DE FER DE CHINE DE FER DE L'ETAT ARGENTIN BUENOS-AYRES ANTOFA- CENTRAL OF BRAZIL RAIL- THE SOROCABANA RY E.F. CHEMINS DE FER FEDERAUX ESTRADAS DE FERRO E.F. RY E.F. CENTRAL RIO GRAN- SUL SAO PAULO RY LEO- CHEMINS DE FER DE L'ETAT CHI- RY E.F. CENTRAL RIO GRAN- SUL SAO PAULO RY LEO- CHEMINS DE FER DE L'ETAT CHI- RY E.F. CENTRAL RIO GRAN- SUL SAO PAULO RY LEO-



The SASKOP-PATENT COUPLER is only one type among many others sold all over the world by the

UEH

USINES EMILE HENRICOT
S. A.
COURT-ST-ETIENNE - BELGIUM

emphasizing them, once more, as pioneers in the steel castings for rolling stock.



THE HEY-BACK RAIL FASTENING

The **POSITIVE** elastic fastening

The Hey-back Rail Fastening with its specially designed baseplate and spring clip provides an effective elastic fastening of the rail independent of the fixing of the baseplate to the sleeper. The fastening allows rails to be removed and replaced with speed and economy of labour. The fastening is adaptable to both wood and concrete sleepers, is simple and requires neither special tools nor skilled labour for fitting and maintenance.

The photograph on the left shows the Hey-back System in use near Neasden on an electric track of the London Transport Executive, whose permission to reproduce this photograph is gratefully acknowledged. Further technical data gladly supplied on request.

WORKINGTON IRON & STEEL COMPANY

MAKERS OF RAILS, FISHPLATES, BASEPLATES AND STEEL SLEEPERS

A branch of The United Steel Companies Limited

WORKINGTON Phone: Workington 206 Grams: "Mosbay" Workington CUMBERLAND

Railway Department: 8/10 Grosvenor Gardens, Victoria, London, S.W.1. Phone: Sloane 4533. Grams: Unisteels: Sowest, London W109 8

THE UNITED
STEEL
COMPANIES LTD

The Railways of BRAZIL purchase 70 more

GENERAL MOTORS LOCOMOTIVES



Progressive modernisation of the Brazilian railway system takes another big step in 1961 with the delivery of 70 more General Motors Diesel-Electric locomotives. 55 units—Models G12 and GL8—are going to the R.F.F.S.A., and 15 GL8's to the E.F. Sorocabana.

The improved productivity GM Diesels are bringing on Brazilian railways is evidenced by the fact that, although the number of freight cars was only 2.3% higher in 1959 than in 1958, they carried 19.1% more freight.

The Rede Mineira de Viacao, for

example, showed an increase in 1959 of 10.7% over the previous year in gross tonnage hauled—a gain officials of the road attribute exclusively to the better service offered by GM Diesel-Electrics.

For construction of the new capital, Brasilia, rail shipments of cement from the Belo Horizonte area jumped from 63,000 tons in 1958 to 99,000 tons in 1959. Diesel-Electric locomotives also handled a 155,000-ton increase in coal loadings from the port of Angra dos Reis to the Cia. Siderurgica Nacional, Brazil's great steel mill at Volta Redonda.

On the Vitoria a Minas, which carries about 90% of Brazil's exports of iron ore, a fleet of General Motors Diesel locomotives transported 3,261,000 tons in 1959 compared with 2,247,000 tons in 1958. This operation showed a profit in 1959 of Cr. 126 million.

Throughout the world General Motors locomotives have proved their ability to haul higher tonnages more economically than any others. To learn the benefits they can bring to your railway, consult General Motors Overseas Operations.

GENERAL MOTORS OVERSEAS OPERATIONS

Division of General Motors Corporation, New York 19, N.Y., U.S.A.

Cable Address: Autoexport

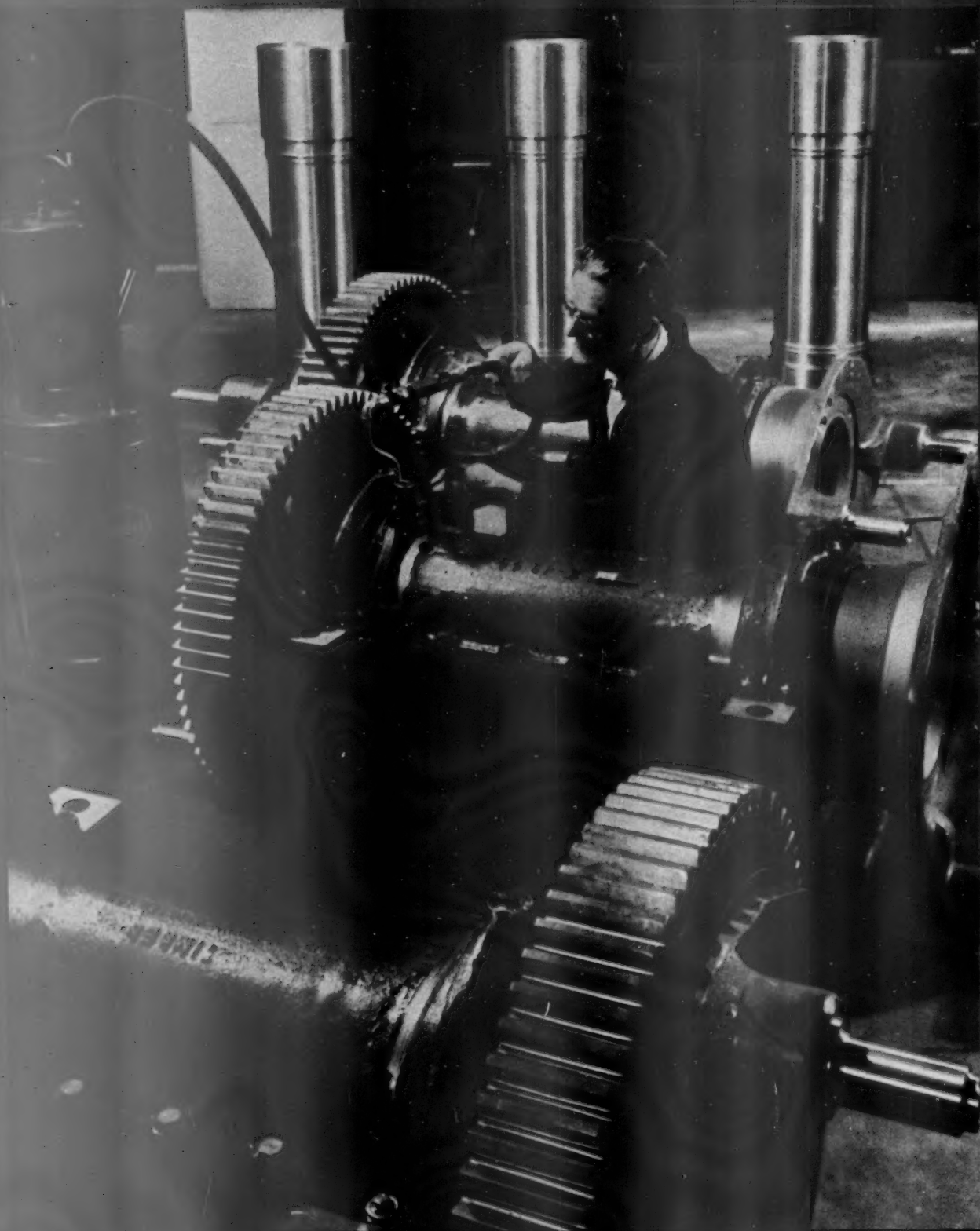
ASSOCIATE BUILDERS: AUSTRALIA—The Clyde Engineering Co. Pty., Ltd., Sydney, N. S. W.
BELGIUM—LaBrugnoise et Nivelles, St. Michel-lez-Bruges • GERMANY—Henschel-Werke, GmbH, Kassel • SOUTH AFRICA—Union Carriage & Wagon Co. (Pty.) Ltd., Nigel, Transvaal
SPAIN—Material y Construcciones, S. A., Barcelona • SWEDEN—Nydqvist & Holm Aktiebolag, Trollhattan

LOCOMOTIVE PLANTS: Electro-Motive Division of General Motors, La Grange, Illinois, U.S.A.
General Motors Diesel Limited, London, Ontario, Canada

General Motors subsidiaries, branches or representation throughout the world



World's Highest Standard — 270 to 2600 H. P.



AEI TRACTION GEARS



Associated Electrical Industries Ltd

Traction Division

TRAFFORD PARK, MANCHESTER 17

The RAILWAY GAZETTE

INCORPORATING: THE RAILWAY ENGINEER • TRANSPORT • THE RAILWAY NEWS • THE RAILWAY TIMES • RAILWAYS ILLUSTRATED
HERAPATH'S RAILWAY JOURNAL (ESTABLISHED 1835) • THE RAILWAY RECORD • THE RAILWAY OFFICIAL GAZETTE

A Journal of Management, Engineering and Operation

VOL 114

FRIDAY JUNE 16 1961

No. 24

CONTENTS

	PAGE
Editorial notes	669
Can British Railways pay ?	671
Progress in Western Australia	672
U.S.A. railway operation in 1960	672
Netherlands Railways summer timetable	673
Victorian labour dispute settlement	673
Decline in railway freight revenue	673
Letters to the Editor	674
The scrap heap	675
Overseas railway affairs	676
Modernisation of permanent way in the Eastern Region	677
Tokenless block working on single line sections	682
Railway modernisation in Western Australia	684
Personal	686
New equipment and processes	688
News articles	690
Contracts and tenders	694
Notes and news	694
Railway stock market and official notices	696

Editor: B. W. C. Cooke, Assoc. Inst. T.

33, TOTHILL STREET, WESTMINSTER,
LONDON, S.W.1

Telephone: WHitehall 9233 (24 lines)
Telegrams: "Trazette Parl London"

BRANCH OFFICES

GLASGOW: 139, Bothwell Street, C.2 Central 4646
NEWCASTLE UPON TYNE: Cathedral Buildings, Dean Street, 1 Newcastle upon Tyne 22239
MANCHESTER: Century Insurance Building, St. Peter's Square Central 7667-8-9
BIRMINGHAM: 90, Hagley Road, Edgbaston Edgbaston 2466—3728—3732
LEEDS: 70, Albion Street Leeds 27174
BRISTOL: 20, Victoria Square, Clifton Bristol 33873
Annually £5 by post Single copies, two shillings
Registered at the G.P.O. as a newspaper. Entered as second-class matter in U.S.A.



MEMBER OF THE
AUDIT BUREAU
OF CIRCULATIONS

Railway viability

THE new Chairman of the British Transport Commission, Dr. Richard Beeching, made it clear at his first Press conference held on June 13 that he is beginning to formulate his ideas on the ultimate size and shape of British Railways and on the reorganisation not only of the structure—and in particular the managerial structure—but on the commercial objectives of a streamlined system more nearly in line with modern requirements of the trading and travelling community. He is obviously sceptical of some of the estimates of return on parts of the modernisation scheme but appreciates the need to effect improvements both in physical assets and in commercial services. Only in this way, indeed, can British Railways be assured of a revival of prosperity in what must be a highly competitive future. It seems clear that Dr. Beeching is viewing both railway management and the railway system as a whole with the eye of a trained businessman whose objective is the well-tried and successful axiom of achieving profits by giving

value and satisfying the customer. In the achievement of these aims, which are relatively simple to expound, there will have to be a great deal of re-casting of thought, not only within the various railway headquarters, but also in Government and commercial circles. The progress which can be made in this direction obviously cannot be rapid, but, provided that it is steady and uninterrupted and can be seen to be capable of achievement, there should be growing support, from both within and without the industry, for the new shape of railways of which Dr. Beeching has given us a glimpse. There can be no doubt that he has set himself and his officers a herculean task and one which will call for the very greatest elements of co-operation from both railwaymen and Government if it is to be achieved within a reasonable period of years. But even if its completion is only well on the way by the time that Dr. Beeching's tenure of office comes to an end, from the national point of view as well as from that of British Railways, the enormous effort which will have gone into the implementation of the plans involved will have been worth while.

Birthday Honours List

A RICHLY deserved peerage for Sir Brian Robertson, until the beginning of this month the Chairman of the British Transport Commission, is the outstanding feature of the Queen's Birthday Honours List. The Barony he receives will give particular pleasure to railwaymen all of whom respect him for the indefatigable efforts he has made in the face of great political difficulties since he assumed office in 1953. Other railwaymen to be honoured are Mr. C. T. Henfrey, formerly Chief Engineer of East African Railways & Harbours (C.M.G.), Mr. Arthur Dean, Assistant General Manager (Modernisation), York, on the North Eastern Region of British Railways (C.B.E.), and Mr. C. S. McLeod, Director of Industrial Relations, British Transport Commission (O.B.E.). Sir Ivan Stedeford, who was Chairman of the Transport Planning Board which produced the Stedeford Report, receives the G.B.E. Mr. G. A. Whipple, Chairman & Managing Director of Hilger & Watts Limited, and Mr. C. F. Barnard, Executive Vice-Chairman, Mirrlees Bickerton & Day Limited have both been awarded the C.B.E.

World Bank mission to Chile

COLONEL Sir Ralf Emerson, formerly Chairman of the Nigerian Railway Corporation and now Chairman of the Metropolitan Carriage & Wagon Co. Ltd., will leave the United Kingdom for Santiago on June 22 as a member of a special mission being sent to Chile by the World Bank. The mission will examine the extent to which the financial allocations to the several sectors of the economy are supported by projects for which preliminary economic and technical studies have been prepared, and will assess what further work needs to be done in the way of project preparation. The review should facilitate the preparation of annual capital budgets and help determine the requirements for outside assistance in financing the economic development of Chile. Mr. John H. Adler, Economic Adviser in the Bank's Department of Operations for

the Western Hemisphere, will lead the mission. There will be eight other members: a chief economist, transport, industry, and power and agricultural economists, and advisers on housing and urban development, railways, highways, and ports.

Combustion Engine Congress

THE British National Committee of the International Congress on Combustion Engines (C.I.M.A.C.) again will have Mr. W. K. G. Allen as its Chairman for the ensuing year. He was re-elected by acclamation at the annual general meeting of United Kingdom supporters on Wednesday, June 7. Mr. Allen's indefatigable work is well-known, and there was widespread satisfaction that he is to continue in office. The progress made by the British National Committee under his direction has been such that all members are determined that he should still be in the chair when the international congress is held in London in 1965. Details have already been given of the Copenhagen Congress next year, and at which it is expected that the United Kingdom will be substantially represented. At the annual general meeting tributes were also paid to Mr. C. C. M. Logan, Hon. Secretary, Mr. K. H. Higgins, Hon. Treasurer, and to the British International Combustion Engine Manufacturers' Association, not only for the services of these two officers, but for its general support which relieves the British National Committee of a great deal of overhead expenditure.

Pondichery Railway Co. Ltd.

THE Pondichery Railway Co. Ltd., which was opened in December, 1879, has been worked since April 1, 1944, by the Government of India as part of the Southern Railway system under an agreement which was made in December, 1890 with the then South Indian Railway. For some years the Pondichery Railway has been operating at a loss and approaches to the Indian Railway Board either to ease this position or to accept surrender of the company's concession on payment of a reasonable sum have not succeeded. An extraordinary general meeting was held in London on June 5, at which a special resolution for the voluntary winding-up of the company was carried. The Chairman, Mr. C. A. Muirhead, said that legal advice had been to the effect that notice terminating the working agreement as from December 31, 1961, should be given and that an application should be made by the liquidator to the Court to disclaim the contract made in 1878 for the construction and working of the company's railway.

New Zealand Railways losses reduced

THE New Zealand Minister of Railways recently announced that, for the third year in succession, a considerable improvement had been shown in the Railways Department's financial position. He stated that, excluding interest charges, the department's loss for the year ended March 31, 1961, was reduced from the March, 1960, figure of £563,133 to only £62,759. Revenue from all sources rose by £1,302,000 to a record of £36,239,000, while expenditure rose by only £802,000 to a total of £36,302,000. The improvement of £500,374 was achieved despite the fact that £1,047,000 more was paid out in increased salaries, wages and overtime payments—necessitated by continuing staff shortages—and without any increases in either fares or freight rates. Goods tonnage rose by 276,000 tons to reach a record of 10,819,000 tons. The Minister commended both the management and staff on the satisfactory outcome of the year's operations.

Development of "Chaix"

FOR many years past the French *Indicateur Chaix* has been as indispensable a companion to the regular French traveller as its British counterpart *Bradshaw's Guide*. But whereas the

latter's lengthy career is now at an end, *Chaix* still pursues its course with unremitting vigour, and has now appeared in a new guise. The train services of the French National Railways have been separated from those of the minor railways, and the bus, coach and *téléphérique* services, which number some thousands. The two are now published in individual books, the former with about 650 pages and the latter with 500, and with striking red and blue covers respectively. Although the type continues to be very small, there is a great improvement in the quality and clarity of the printing. The use of colours in indicating the various Regional sections, and the coloured pages of general information and of hotels, add greatly to the value of these compilations. The *Imprimerie Chaix*, which publishes the *Indicateur*, is also responsible for the condensed *Horaires Mayeux*, which show all main services in a handy pocket form—an admirable example which might well be copied here.

East African localisation and training

IN its "Review of localisation and training," the East African Railways & Harbours administration explains that racial scales were abolished in 1954 and that, since then, promotion and appointments have been made only on experience, ability, and qualifications. Furthermore, it states that the official policy will be one of progressive localisation—or largely Africanisation—on a non-racial basis. Existing recruitment and training will be continued and expanded, including supervisory training of serving staff. Staff will not be recruited from overseas unless this is absolutely necessary; last year only six expatriates were engaged. Simultaneously, there will be accelerated promotion for serving staff consistent with standards of efficiency. The 1956 bursary scheme to encourage local candidates to qualify at U.K. universities for appointment to the E.A.R. & H. cadetships will be adapted to fit in with the programme of training staff locally.

Engineering handbook 1961

THE 1961 edition of the British Engineers' Association's Handbook* is available. This work, published annually for the past 30 years, includes a comprehensive list of products and their manufacturers, classified under more than 3,000 headings, in English, French, German, Portuguese, and Spanish. The object of the publication is to assist purchasers of British engineering plant, machinery, or accessories, to make contact with reliable sources of supply. It is backed by the Information Division of the Association, which is always ready to extend assistance to enquirers. To avoid delay and disappointment it is of importance that enquiries from overseas should always describe local conditions. These can largely affect the selection, design, construction, and packing of machinery and other goods required. Attention to this point may well save trouble to both vendor and purchaser.

Electrical fire on London Transport train

"THIS accident should not have occurred." That was the verdict of Colonel D. McMullen, Inspecting Officer of Railways, Ministry of Transport, in his report—summarised elsewhere in this issue—on the fire in an underground train near Redbridge on the Central Line of the London Transport Executive on August 11, 1960. The circumstances of the accident were very similar to those of the fire on an underground train near Holland Park in July, 1958, which also had been investigated by Colonel McMullen. He found that the Redbridge fire would not have occurred if the lessons of the previous fire had been learnt and applied at Ruislip Depot. On the other hand, he was at pains to point out the many safeguards which had

*Obtainable from the British Engineers' Association, 32 Victoria Street, London S.W.1. Price 21s.

been introduced by London Transport since both fires. Every practicable precaution against arcing, which had caused both fires, had been or was being taken. Colonel McMullen also thought that the station staff at Redbridge had acted well in the emergency, while the train crew had done all that could have been expected of them in very difficult circumstances.

Reorganising Italian Railways

It is reported that a plan for the general reorganisation of the Italian State Railways is to be submitted to the Government, with the object of placing the railways on a firmer technical and financial footing. The railways have been running a large deficit, and have been unable to spend enough on upkeep and technical improvements. The reorganisation plan provides for (1) a 15 per cent increase in charges for passengers, a 10 per cent increase for goods and a 20 per cent increase for luggage; (2) the closing of some 1,000 miles of lines which carry little traffic; (3) a law granting the railways a greater degree of administrative autonomy; (4) a 10-year capital investment plan for just under £500 million; (5) the limitation of free and reduced travel facilities.

Can British Railways pay?

IN a release distributed at his first press conference since assuming the Chairmanship of the British Transport Commission, Dr. Richard Beeching stated that, until now, whenever the future of British Railways had been considered, its continued existence as an extensive national network had never been doubted. Attention had been centred on modifications and improvements. Railways were just about paying their way when modernisation was first planned, though greatly run down by wartime and post-war conditions. The marked financial improvement which had been expected as a result of the modernisation now in progress had not materialised: although total passenger traffic had been maintained, total freight had declined: severe competition had developed from other forms of transport and the rise in fares and charges had not kept pace with increased costs. Doubts on the future of the railways had grown to serious proportions.

The financial difficulties of the railways were long-standing and deeply rooted. They would not be quickly eliminated and might get worse before they got better. Although immediate economies were important, it would be wrong to seek temporary savings at the expense of attention to root causes. Elimination of redundant parts of the system and of unremunerative traffics must be speeded up. The removal of restrictions which distorted the pattern of traffic and artificially influenced the locations of industry and population would increase revenue without unreasonable increases in fares and rates. There must be intensified study of present working and prospects.

Although this study might cause modification of the later stages of modernisation as at present planned, drastic curtailment of the programme at this time would be a mistake—the modernisation which had been carried out so far had greatly improved the quality of some services. So far, the plan had provided for the modernisation of equipment and of the physical rail system. It was now necessary to modernise the managerial structure and the manner in which the system was operated in relation to a very different pattern of user requirements. Modernisation alone would not lead to viability—related to the main-line system, this would depend on radical modification of services available for the carriage of merchandise.

The possible effects of modernisation had been too optimistically estimated: although improvement would be substantial, much expenditure must relate to deferred maintenance and replacement. While it might ultimately be possible to credit modernisation with the improvement in net receipts of £85 million which had been expected of it, benefits more probably would result from changes in operation, the system itself having been kept in existence by expenditure on moderni-

sation. The failure to produce rapid financial improvements was no indication of the ultimate benefit likely to be obtained from the plan. Too little importance had been paid to the effect of disturbances caused on an already overstrained system by modernisation and resultant overburdening of staff. Most major works of modernisation would have to approach completion before appreciable financial improvement or better services could be expected—they were only now beginning to show results. Financial benefits were likely to become apparent later than effects on service quality. Even if it was ultimately decided that a railway system had little prospect of future viability, it would not then be possible to plan and provide alternative transport capacity very quickly. The railway system of the country was an asset of such potential importance and of such high replacement value that a continuing life of many years seemed to be assured for most of it, even if, meanwhile, its ultimate replacement was planned. To keep the system in being, a great deal of replacement expenditure would be necessary in any case, and failure to replace and modernise now would almost certainly lead to greater cost, in the form of increased operating losses, than the capital saving likely to be achieved by sharply curtailing modernisation at this stage.

There was a need for early decision as to what the true prospects for the system really were, so that later stages of the programme might be modified if necessary. It was misleading to generalise: some traffics paid well, some contributed inadequately to fixed charges, and some caused direct losses. The London suburban lines and a large part of the predominantly passenger-carrying Southern Region, as well as suburban lines feeding a few other cities, would be required for as far ahead as it was possible to see. They would be needed, even if they were caused to operate uneconomically, and most of them could be made to pay.

The main uncertainty centred on the potential viability of the main-line network, plus a limited number of its more important feeding and connecting lines, which carried the bulk of the freight and middle- to long-distance passenger services. Uncertainty centred mainly on freight traffics and, in particular, on merchandise traffic. It appeared probable that revenue from medium- to long-distance passenger trains, which had kept up well so far, would be sustained and possibly increased as modernisation took effect. Unless freight receipts could be considerably increased, the main-line system would not pay. Only general merchandise traffic offered prospects of very considerable expansion. The important points relating to this traffic were (a) that the railways' share of its total was small—therefore, large gains were possible; (b) developed for the movement of coal and minerals, the main railway freight structure was not suited to most merchandise traffics and the development of other forms of transport had made it unacceptable to many potential users. Therefore, large improvements in quality of service were potentially attainable.

Detailed studies would be made as soon as possible on the costs of handling existing traffics by existing methods; determination of those forms of traffic which railways do or could handle more satisfactorily and cheaply than do other modes of transport; patterns of traffic flows, both by rail and by other forms of transport to discover the available volume of traffic favourable to rail and how it moves—these studies were particularly important, but also particularly difficult, in the case of merchandise traffics; how the railways' system of freight handling could best be modified to attract the maximum amount of remunerative traffic; how much traffic could be attracted by the various possible modifications and the potential profitability of the business so obtained. These studies would take time but only when they had been carried out would it be possible to forecast whether the railways as a whole could again become self-supporting.

Railway fares and freight charges were not high and, over the years, had increased less than cost factors which affected transport, less than prices generally, and considerably less than wage and salary levels. If present limitations were

removed, a worthwhile increase in revenue and a more satisfactory pattern of traffic could be achieved without raising charges to unreasonable levels. The main aims of British Railways must be to bring the standard of services to an acceptably high level; to operate services efficiently and economically, and to make the whole business pay its way. A level of courtesy, smartness, and intelligent helpfulness on the part of the staff could cause a more rapid improvement in the public's judgment of quality than anything else. Railwaymen must become anxious to earn more so that they could be paid more. The finding of ways to make this possible was a responsibility of management, but quick introduction of the methods depended on co-operation between management and men based on recognition of a common interest. To take advantage of the improved services which could be provided, a stronger commercial organisation must be built up and a more forceful policy must be adopted. Better costing, and the removal of restrictions on freight rates, were important steps in this direction.

Progress in Western Australia

BBROADCASTING on behalf of the Premier of Western Australia, the Acting Premier of Western Australia, Mr. C. W. M. Court, stated on May 24 that financial figures showed the most encouraging development in Western Australian railways since the war. The Railways Commissioner, Mr. Wayne, and his 12,500 staff were building a new tradition and creating a new image; within only two years, the railways had developed from being a desperate financial problem to become a progressive force. Although much remained to be done, the first important steps had been taken.

In 1958 a net deficit of £5,400,000 had hung over the railways; in 1959 the net deficit was still over £5 million. In 1960 the deficit had been reduced by £650,000, and there was every reason to believe that railway performance would improve still further. Figures for the first 10 months of the current financial year indicated that the deficit was £834,000 lower than that of the same period last year. In May it stood at just over £2,800,000 against over £3,650,000 for the comparable period last year. These figures allowed for depreciation and interest.

This year, for the first time since 1946, the W.A.G.R. would earn more money than it paid out in operating expenses. In the 10 months to the end of April, an operating surplus of £645,000 had been achieved. This result was achieved despite the fact that the railways had to absorb over £500,000 of rising costs in the form of basic wage rises, award variations, and marginal wage increases.

Records were being broken in many avenues of business. In March the system carried a record total of 111,600 tons of superphosphate as well as nearly 200,000 tons of grain. In May another record was broken when 55,600 tons of grain were handled, a record figure for a single week.

Railway efficiency drive had led to a wholesale reorganisation of train schedules and the elimination of a great amount of unnecessary running which had crept in over the years. In the South West, to take one example, 108 goods services a week were cancelled without any reduction in the service given and this created a saving of nearly 200,000 train-miles a year. Up to the end of February the average train-load increased by 51 tons compared with the same period in the previous year, an improvement of 16 per cent.

During the past two years there had been a tremendous lift in railway morale. Mr. Court believed this had resulted from a renewed sense of purpose and achievement. Men who had spent their lives in the railways could now see clearly a complete vindication of their belief in its essential value to the State. This feeling of pride was heightened by the steady improvement in railway equipment—both in the transport of goods where most of the railway revenue was earned, and in the transport of passengers.

The improvements now being achieved would be continued: better styling of passenger trains and buses, already indicated by the new "Australind," would spread throughout the system. Streamlining of goods services would continue—even though it was already possible to send a ton of goods from Perth to the South West as quickly as a letter. Before long, the system would call tenders for six powerful diesel-electric locomotives for use on main-line freight services. These would enable the railways completely to dieselise freight handling on the Perth-Kalgoorlie line, without waiting for standardisation.

The system also was examining the problem of providing an even better service between consignors and consignees. One problem was that goods sent by rail must be taken to the station by lorry and off-loaded at the other end. The considerable handling involved might be greatly reduced by the use of special containers, a method already successfully applied to sea transport.

Some aspects of Western Australian railway modernisation are described on pages 684 and 685.

U.S.A. railway operation in 1960

THE Association of American Railroads has a generous custom of circulating each April a review of railway operations in the United States, prepared by Mr. J. Elmer Monroe, Director of Railway Economics. In the 1960 survey Mr. Elmer Monroe discusses some of the problems besetting the American transport industry, but this article deals solely with the railway statistics which he records with admirable clearness.

A disappointing traffic volume held revenue wagon-loadings down to 30,440,000, a decrease of 1.9 per cent from the feeble year 1959 and almost 25 per cent below 1951 loadings of 40.5 million. Coal loadings were 108,000, or 2 per cent, fewer than in 1959 and at the lowest level for over 40 years. Less-than-wagon-load traffic was 14 per cent under 1959 and is fading away rapidly. So is livestock business; 250,000 wagons were forwarded, against 300,230 in 1959 and 629,675 in 1948. Trailer-on-flat-car loadings were a third above 1959, but less than 2 per cent of total loadings. Many railways enlarge on the growth of this new traffic, but do not state the net revenue earned after much expenditure on special wagons and terminal facilities.

Revenue ton-miles of 572,216 million were 0.5 per cent down from 1959 and 11 per cent under the 1956 level. The corresponding freight revenue, which accounts for over 80 per cent of all operating revenues, was \$8,025 million, a decrease of \$287 million, compared with 1959 but \$930, over 10 per cent, below the 1956 receipts of \$8,955 million. The persistent decline in passenger-miles went on at the rate of 3.6 per cent from 1959 and oddly at a rate of 48 per cent below 1948. In consequence passenger revenue was off by \$11 million, or 1.7 per cent, from 1959 and takings were about a third less than in 1948.

Last year was the fifth successive one of declining railway earnings. Net railway operating income (earnings before interest and other fixed charges) was \$584 million, a drop of \$164 million from 1959 and the lowest level for any year since 1938. Net income (after fixed charges) was \$445 million, 23 per cent below 1959 and half of the amount in 1953, which was a fairly good year for both American and British railways. Operating expenses in 1960 were cut by \$140 million, but the operating ratio rose from 78.4 per cent in 1959 to 79.5.

The remarkable feature of 1960 operations was the high standard of performance in a year of diminishing ton mileage. An average freight train speed of 19.5 miles an hour was maintained, though the wagon-load was a record at 34 tons and the net train-load of 1,466 tons was the highest ever. The hourly output of freight train operation at 63,070 gross ton-miles was 58 per cent above productivity in 1948. Railroad being a volume affair, it is not surprising that the daily mileage of locomotives and serviceable wagons declined slightly.

To attain these results the railways had at the close of 1960 a fleet of 28,369 diesel units and 48 turbine-electric locomotives; they also owned 232 steam locomotives, the last remnants of a stock of 65,000 in 1924. The railways have no qualms about this change of motive power. The 1960 report of the Illinois Central, a large coal carrier, states that the retirement of 176 steam locomotives during the year and the addition of 15 diesels of 1,800 h.p. broadened the scope of its savings in freight train operation. The I.C. now owns 627 diesel units and 43 steam locomotives, which may be scrapped in the near future.

Mr. Elmer Monroe is not optimistic about the future. He thinks the railways cannot rely on increased production in the steel, coal, and other basic industries which furnish the bulk of freight traffic. As from March 1, the railways bear the burden of \$100 million new costs a year for improvements in conditions of service. In 1960 they paid about \$3.37 for each hour an employee worked and the average annual earnings of employees were \$6,270 against \$3,785 in 1950, a rise of nearly 66 per cent. The inevitable result was a drop in the average number of employees from 1,220,780 in 1950 to 780,490 in 1960, or 35 per cent. At the end of February, 41 of the railways were in deficit and it is hard to see how they can pay these extravagant wages. The March statement of revenues and expenses may throw some fresh light on the American railway position.

Netherlands Railways summer timetable

THE Dutch railway timetable offers perhaps the most outstanding example of "clock-face" working over a country-wide area. Not only are most of the important inland services scheduled at the same minutes past the hour throughout the day, but most of the services are so arranged that regular connections are made at major junctions and interchange stations "every hour at the hour."

Under the 1960 and 1961 summer timetables, this system has been put in effect still further. This has been done mainly to cater for the partly conflicting requirements of passengers travelling between major towns or junctions, and those travelling to or from intermediate stations. Where traffic is heavy enough to warrant the running of more than one train an hour, the timetable has been so arranged as to provide a stopping as well as an express service, both with good connections at major intersections.

In the course of this rearrangement, the number of such alternating services has been greatly increased; more long-distance express connections have been created, and new through connections have been introduced not only between different Dutch towns, but also with adjacent towns in Belgium and Germany. Where two towns are linked by more than one service an hour, these services have been rearranged so as to provide, as far as possible, a regular distribution over the hour.

The basic "clock-face" system comprises the following four groups of services:—

- i. Express services between Rotterdam, The Hague, and Amsterdam on the one hand, and the North and East of the country on the other, with Amersfoort as the key junction;
- ii. Express services between Rotterdam, The Hague, Amsterdam, and the south of the country, with Eindhoven as the key junction;
- iii. Semi-fast services between Rotterdam, The Hague, Amsterdam, and Maastricht and Arnhem, with Utrecht as the key junction;
- iv. Semi-fast services between Rotterdam, The Hague, Amsterdam, and Maastricht, Rosendaal and Nijmegen, with s'Hertogenbosch as the key junction.

These basic services are supplemented by regular connecting services covering the major part of the country.

Among this summer's innovations in Dutch international

train services is a weekly car sleeper service between Amsterdam and Domodossola. This leaves Amsterdam on Friday afternoons (16.18) to arrive at Domodossola on Saturday mornings (7.40), and leaves Domodossola on Wednesday evenings (22.15) to arrive at Amsterdam on Thursday after lunch (13.21). This is in addition to the weekly car sleeper service between Amsterdam and Avignon. There are also improvements in international connections affecting the North-West Express and the Holland-Scandinavian Express.

Victorian labour dispute settlement

THE settlement of the two-year-old Victorian Railways labour dispute announced by the State Premier last February was a compromise. It had to be approved by the State Parliament, and would give railwaymen three choices. They were:—

- (1) Full superannuation with no service grant except for those over 50 with seven years' service, and others over 40 with 20 or more years' service.
- (2) A service grant for those with not more than four units of superannuation.
- (3) No superannuation but a service grant and a retiring gratuity.

For men specifically excepted from (1), 10s. a week would be given as a service grant provided that they had four and not less than 23 units of superannuation and were not earning more than £1,650 a year. The retiring gratuity would be based on a rate of £22 10s. for each year of service on retirement at 60 years of age or over, or earlier if subject to ill-health or at death with a minimum of 10 years' service. Service grants were 5s. a week after three years' service, 10s. after five years, and 20s. after seven years' service.

Every officer and employee would be allowed three months to make his or her irrevocable choice. It was estimated that, in effect, about 90 per cent of the railway staff would share an additional £800,000 a year on the pay roll, rises ranging from 5s. to £1 a week, and dating from February 5, though they would not be paid until the Arbitration Court and Parliament had agreed.

Decline in railway freight revenue

BY A CORRESPONDENT

THE four weeks to April 23 were a lean period for British Railways as freight carriers. All classes of goods and mineral traffic wilted, the total loss being 603,000 tons, or 3.3 per cent. Ton-miles dropped by 66 million, or 4.8 per cent, and freight train revenue shrank by £814,000, or 4.2 per cent. These doleful results mean that over the first 16 weeks of this year the railways lost 974,000 tons of traffic (1.2 per cent), worked 114 fewer ton-miles (1.9 per cent) and earned £1,817,000 less revenue from freight train service, a fall of 2.1 per cent. A further loss of £444,000, or 2.4 per cent, is estimated for 4 weeks to May 21, so that the position by the end of the half year will indeed be precarious.

Over the 16 weeks coal and coke accounted for the loss of 1,284,000 tons, 2.6 per cent. Merchandise loadings were 267,000 tons higher, 2.1 per cent, and there was a slight rise of 43,000 tons in minerals. Fifty million more merchandise ton-miles were worked, a rise of 2.8 per cent, but the increase in receipts was only £461,000, or 1.4 per cent. Mineral ton-miles were down 44 million (2.9 per cent) and mineral receipts were £577,000 less (3.7 per cent). The railways worked 120 million fewer coal ton-miles and revenue from coal and coke dropped by £1,701,000, or 4.7 per cent. The North Eastern Region was singular in forwarding 213,000 more tons of coal, a rise of 1.6 per cent, and in working 15 million more coal ton-miles, an advance of 4.3 per cent.

Among the other regional results for weeks, 16 one striking item is a rise of 145,000 tons, nearly 18 per cent, in the Southern's

despatch of merchandise, causing a movement of 9.6 million more ton-miles. The Southern also worked 3.7 million more mineral ton miles (6.8 per cent). Altogether, the North Eastern produced 21 million additional ton-miles (2.7 per cent). The Scottish output was also up 12 million (2.1 per cent). In a wider area the Eastern turned out 1,184 million ton-miles, an advance of nearly 10 million, or 0.8 per cent.

On the western side of the country the trend was reversed. The London Midland Region originated 938,000 fewer tons of traffic, a fall of 4.2 per cent, and its ton-miles dropped by about 91 million, or 4.5 per cent. The Western Region lost 441,000 tons, 3.4 per cent of its 1960 freight traffic, and turned out 77.5 million fewer ton-miles, a decrease of 6.6 per cent.

Fortunately, passenger revenue increased in each 4-week

period this year. Over 16 weeks total receipts of £41,705,000 were £2,862,000, or 7.3 per cent above 1960. The additional takings probably result from higher fares. In the first quarter of the year passenger journeys decreased by 1,680,000, or 2.2 per cent. The London Midland recorded 312,000 more journeys and the Eastern, 318,000. There was also a small increase of 26,000 in the North Eastern, but the Southern lost over 2 million passengers, the Western 104,000 and Scotland 109,000. At the present high level of expenditure on passenger facilities, the margin of profit from train travel must be small. Neither is the volume of parcels by coaching trains expanding greatly; receipts during 16 weeks to April rose only 0.2 per cent and working costs are high. Freight will always be the main support of our railway system.

LETTERS TO THE EDITOR

THE EDITOR IS NOT RESPONSIBLE FOR THE OPINIONS OF CORRESPONDENTS

RAILWAYS INTO ROADS

June 8

SIR, In your issue of May 26, Mr. C. Hamilton Ellis raised doubts about the capacity of railways converted into motor roads being sufficient to pass a substantial volume of ordinary road traffic, apart from that which would be generated by carrying the railways' existing traffic in terms of road vehicles. The overall use of railway routes is low, as may be appreciated from the fact that on average only 13 wagon-miles are run over each mile of running line per weekday-hour, and about a further half this number would probably be appropriate for coaching vehicles.

Only a comparatively small proportion of double-tracked main lines are regularly called on to pass more than 60 vehicles per hr. in either direction, and routes whose peak vehicle density exceeds 120 per hr. in either direction are usually largely or wholly multiple-tracked. Exceptional rates of flow are achieved over some London electrified suburban lines in the rush-hours with up to 250 vehicles per hr. per running line, but the route mileage operated under such conditions is very small.

On road traffic lanes where the flow is uninterrupted rates of more than 1,000 vehicles per hr. are readily attainable, so that virtually everywhere on railways there are considerable potential reserves of capacity which could be exploited if conversion were to be realised. Taken generally, this additional capacity should be more than adequate for all normal demands likely to be made upon it by medium to long-distance road traffic, for a sample survey carried out in 1956 indicated that only 1 per cent of the highways in this country actually carried more than 10,000 vehicles per day, both directions combined, and the average daily flow on trunk roads was less than 6,700.

Around a few of the largest cities short-distance private car traffic could ultimately tend to overtax the system and some control of access in suburban areas would be desirable. Perhaps the most effective way of dampening the demand among those making local journeys in these areas would be by charging tolls. The merits of this method recently have been recognised in respect of urban motorways by Political & Economic Planning in its publication "The Cost of Roads," where it is described as "a way of rationing scarce road space to those users who are willing and able to pay the toll imposed."

In the London area particularly, appreciably higher tolls might be charged during the 60 to 90 min. of the business peaks for private vehicles seeking access in the direction of pre-dominant flow, so regulating car commuter traffic to a level at which public passenger transport vehicles could play their vital role without prejudiced performance. The drivers of longer-distance private vehicles unwilling to pay the higher

toll charges would, no doubt, adjust their journey times accordingly.

Yours faithfully,

BENBOW

Middlesex

INEFFECTIVE RAILWAY MOTOR POWER

June 2

SIR, The article under the above heading on page 614 of your June 2 issue states something that has long needed to be stated.

May I draw your attention to something else that might have been pointed out at the same time? In the current issue of *Transport Statistics* under the heading of Traction-miles, for 7½ per cent of diesel locomotive traction-miles an assisting locomotive is required, but for less than 1 per cent of steam locomotive miles is an assisting locomotive required.

Yours faithfully,

J. B. LATHAM

Channings, Kettlewell Hill,
Woking, Surrey

WORLD BANK FINANCE

May 31

SIR, I read in an article in *The Railway Gazette* of May 19, 1961, on page 553, that the Minister of Transport for Queensland had engaged American consulting engineers for a report on the Queensland Railways because "it seemed logical to employ consultants of the same nationality as that which formed the mainspring of the concern which might supply that finance."

The source of finance in this case is, according to your article, the World Bank, and it is well known that the Bank is of international character and that advisers and consultants on any subject can be of any nationality and they must be completely impartial and not connected with any commercial organisations interested in the project.

I know that certain propaganda has been circulated saying that only U.S.A. consultants are able to obtain loans for their clients from the World Bank. Records show that such statements are quite untrue and that British and other non-U.S.A. firms participate in World Bank negotiations with considerable success.

I hope that this letter will clarify a misconception that has existed all too long.

Yours faithfully,

ANDREW B. HENDERSON

Livesey & Henderson, Consulting Engineers,
1-2, Finsbury Square, London, E.C.2

The Scrap Heap

Dental stopping

A British engineer using the toilet on a Nancy-Dijon express, recently, lost his denture, which was flushed out on to the track. He pulled the communication cord and passengers joined in a vain search for the teeth. The 10-minute delay disrupted the Nancy-Dijon service.

Government shake-up

The U.S. Democrat Senator J. William Fullbright has said that underground railcars which take senators between their offices and the chamber each day give a jolting, jarring, nerve-racking ride. He claims that this is entirely responsible for the irritable, testy, acrimonious atmosphere in the Senate.

Yen for riches

Pickpockets operating on the Japanese National Railway Corporation's trains are reported to have stolen 550,000 yen (£550 sterling), in a single night on one express. The summer holiday season presents the best opportunity for the thieves and the railway authorities are to create mobile police units during the summer to combat the situation.

New Zealand's first railway

Celebrations to mark the centennial of New Zealand's first railway will be held in Christchurch in 1963. The line, which ran from the present Christchurch-Lyttelton line to Ferrymead, was opened in December, 1863. The Canterbury Pilgrims & Early Settlers' Association has set up a plaque to mark the site of the first railway. On it is inscribed: "New Zealand's first railway. This stone marks the site of Ferrymead wharf and railway station. The provincial broad-gauge railway started here for Christchurch in the year 1863."

Hertford branch special

The South Bedfordshire Locomotive Club will run a special train over the goods-only Welwyn Garden City-Hertford line on September 16. The train is scheduled to depart from Luton Bute Street Station at approximately 2.15 p.m. and will proceed via Welwyn Garden City to Cowbridge. Stops at the closed stations will be made en route and steam haulage will be used throughout. The Hertford section lost its passenger service in 1951 and the Luton section is now exclusively diesel, so the train will provide a steam run over a diesel branch as well as a closed section. The train will also call at Harpenden East in each direction and passengers may join the train at this point.

RAILWAY SUPERANNUITANT



"Caerphilly Castle" on its way to the Science Museum at South Kensington

Tickets, which will be sent as soon as possible, probably late July, may be reserved from Mr. B. C. Locket, 107, Carlton Crescent, Luton, Beds. Fares for adults are 10s. 6d., for juniors under 14, 5s. 3d.

Locomotive destroys enemy aircraft

The former L.B.S.C.R. 0-4-4 tank locomotive, one of a class designed by Robert J. Billinton and introduced in 1892, achieved what is believed to be unique distinction in her latter years by becoming the only railway engine ever known to have destroyed an enemy aircraft. The claim story is told in a posthumous article by J. N. Maskelyne published recently in *The Model Engineer*. The incident happened on November 28, 1942, when No. 365, formerly *Victoria*, was working a train on the coast line between Brighton and Chichester; she was seen by the pilot of a raiding enemy aircraft who, with his machine gun in action, came down low to attack. Apparently he misjudged his altitude, and as he swooped over the train some projection on the aeroplane collided with No. 365's dome, which was knocked off. The explosion of steam from the engine's boiler overturned the plane which crashed in a nearby field and was totally wrecked; the pilot died of his injuries. Mr. Maskelyne added: "I am glad to be able to add that No. 365's crew were

not seriously hurt and the engine sustained only superficial damage; she was repaired and, a few months later, was back in service."

Drive a good bargain

George John Charles Bowering, a former railway engine driver, left just over £15,000 when he died last Christmas, aged 82. He started on the railway when he was 16 years old and retired in 1941 during which time he never earned more than £4 10s. a week. His son explained that both his father and his mother had been very shrewd and had put all their savings into land and property when it could be bought at a reasonable figure.

Minimum inconvenience ?

The Stationmaster at Wimbledon Station on the Southern Region of British Railways remonstrated with the driver of a mini-cab offering free lifts outside the station recently and said that the cab must move on. Taxi drivers had threatened trouble unless the mini-cab was prevented from achieving its object and he did not want physical violence outside his station. Later, four mini-cabs made their appearance at the same station and were eventually moved on by the police for parking in a no-parking area. The Stationmaster said that legal action for trespass is being considered.

OVERSEAS RAILWAY AFFAIRS

FROM OUR CORRESPONDENTS

VICTORIA

More diesels ordered

Ten more "T" class diesel-electric locomotives are being ordered by the Victorian Government Railways. The first should be delivered in February, 1962, the others following progressively. Delivery should be complete by June, 1963. Generally, these locomotives will be identical with the 900 h.p.-type already in use, and will bring the diesel fleet up to 130 locomotives. The "T" class has proved exceptionally versatile, being useful on heavy and light lines for both passenger and goods traffic, and for shunting work.

INDIA

Proposed subsidiary port of Calcutta

It is reported that the World Bank is prepared to provide foreign exchange to the value of about £18,750,000 for the construction of a port at Haldia to relieve congestion at Calcutta. The Calcutta Port Commissioners in their report on the project advocate a dock layout, as opposed to a jetty system, for normal shipping but consider that, in the first phase, the minimum requirements are berths for coal, ore, grain, and also one for general cargoes on the bank of the river.

[The exact position of Haldia is not stated but it is probably at the mouth

of the Haldi River which flows into the Hughli estuary on its right, or west, shore. A railway to the new port would presumably have to be built from the S.E.R. main line between Howrah and Khargpur. Ed. R.G.]

Record wagon loadings

During the financial year ended March 31, 1961, the record number of over 10 million wagons loaded on Indian Railways was achieved. This was 400,000 more than in the previous year.

Manufacture of diesel locomotives

A special committee appointed to report on the manufacture of diesel locomotives in India has recommended various sites as suitable. It estimates the cost of the undertaking at over £9 million. Targets mentioned were that the first locomotive be produced within three years and that production should be at the rate of 100 locomotives a year. The size of the project and the timetable recommended have been approved by the Ministries of Railways and Commerce & Industries.

BURMA

Main-line express ambushed

On March 26 the Mandalay-Rangoon express was mined by Karen rebels about 150 miles from Rangoon. The derailed train was attacked with automatic wea-

pons, and 23 people—mostly soldiers or Government officials—were killed, about 100 injured, and 60 were taken as hostages.

SOUTH AFRICA

New locomotives and rolling-stock

During the first quarter of 1961, the South African Railway administration placed in service 23 electric locomotives (Class "5E1"), 11 new diesel-electrics (Class "32") and five 2-ft. gauge locomotives. The last were acquired from the Tsumeb Corporation of South-West Africa.

Passenger stock placed in traffic during the same period included 38 caboose coaches, three electric motor-coaches and 10 electric plain trailers, all built by the Union Carriage & Wagon Company at Nigel. Twenty-five conductors' vans for passenger trains were delivered during the period by Linke, Hofmann & Busch of West Germany.

Goods stock added during the first quarter consisted of 947 vehicles of various types as well as eight goods-train conductors' vans and 30 narrow-gauge goods wagons supplied by the Tsumeb Corporation.

Stock withdrawn from service and scrapped during the quarter consisted of 599 goods wagons, 18 passenger coaches, one narrow-gauge locomotive, and one narrow-gauge passenger coach.

Refreshments for non-whites

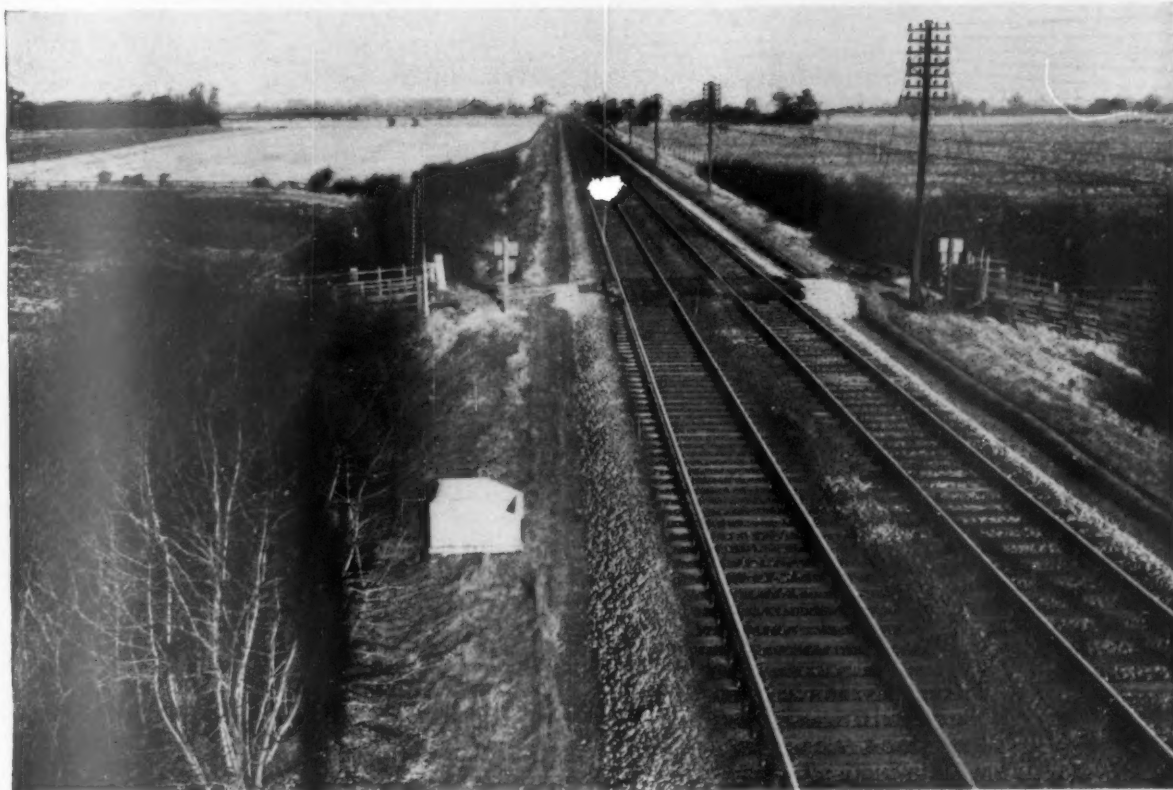
On April 19 a tastefully decorated restaurant and cafeteria were opened in the new station non-white concourse at Johannesburg. In a garden setting this, the first non-white restaurant in South Africa, seats 200 for table d'hôte meals, and 150 can sit in the self-service cafeteria.

Administrative offices in Cape Town

On February 24 the South African Minister of Transport opened the Paul Sauer Building skyscraper in Cape Town. It is the Cape Western System administrative office block, a striking example of modern architecture harmonising with a superb setting, having Table Mountain as background, and the other new buildings of the foreshore development. It is in the part of the city built on foreshore reclaimed from the sea by the S.A.R. & H., and is named after a former Minister of Transport.



First train to pass over the converted line referred to editorially in our last issue



Continuously-welded rail on Jarrah sleepers

MODERNISATION OF PERMANENT WAY in the Eastern Region

ON MAIN trunk routes modernisation involves more and heavier trains, travelling at higher speeds, and hauled by new forms of motive power. To cope with these new factors, much attention is found to be necessary to track and formation.

Most of the present track formation is over 100 years old and, while the ballast depth and consequent loading on the formation, together with the drainage system, may have been generally good enough for the trains of a century ago, it is now found that, in clay terrain, increasing weight and speed of trains has overstressed the formation, with consequent deformation failure of the clay. The signs of this failure at track level are pumping sleepers (particularly at joints) with accompanying difficulty in maintaining top and line on the track.

Moreover, the drainage systems put in at the time when the railways were built were not always designed to facilitate maintenance, even if they were adequate in extent. In addition to the conditions referred to above, caused by

drainage shortcomings, there are concomitant difficulties in maintaining the track.

Many unprofitable branch lines have been or will be closed, but many branches carrying lighter traffic will remain. Formation conditions here are not so formidable.

Nevertheless, on all lines, the permanent way of the future must be maintained by a redeployed labour force, working as mobile gangs and assisted by carefully selected machines to justify the initial outlay in obtaining the machines together with the cost of their maintenance and renewal.

Formation

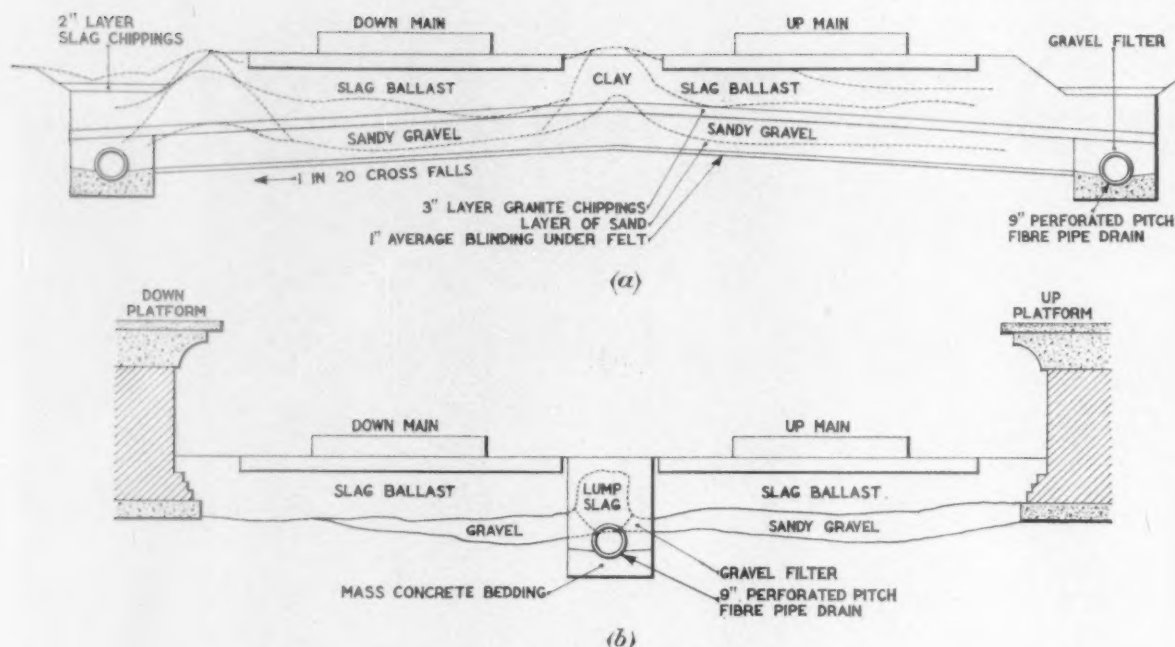
Track improvements for modernisation begin with drainage and formation work. As always, basic investigation

More and heavier trains, travelling at increased speeds, demand improved track

into any track improvement scheme involves consideration of the drains. Where formation has deteriorated to a considerable depth, blanketing may be required; but elsewhere less drastic treatment may suffice.

The first diagram (fig. 1a) shows a typical cross-sectional build-up of the new formation and drainage in cuttings, the dotted lines indicating how the formation failed. It will be noted that the section shows two layers of roofing felt laid on a sand blanket to make an impervious layer, but from very recent date the roofing felt has been superseded by the use of unjointed Polythene fabric laid from rolls at the required width. This method is proving economical in time and labour.

Fig. 1b illustrates a typical cross-section of the provision of track drainage through platforms. The pipes



Figs. 1a and 1b—diagrams illustrating typical blanketing methods

used in all these drainage works are generally of the perforated pitch-fibre type, but in some cases perforated metallic pipes are used.

Electrification

On the Eastern Region the ultimate aim may be regarded as an extension of electric operation over certain main lines. Experience of the existing electrified lines shows that the track receives far greater punishment from electric multiple-unit stock than from any previous forms of traction. On all lines to be electrified, therefore, it is essential that track

ballast is of adequate depth to give better distribution of load over the formation to carry this type of traffic. It is also true that greater depth of ballast reduces maintenance costs. Hence the large amount of blanketing, deep re-ballasting and ballast cleaning being done on this Region.

The typical method of blanketing has already been dealt with, but the majority of the track does not require such major work, and here a rail-borne ballast-cleaning machine can be used as an excavator or cleaner, subject to site requirements. The machines cut out the clogged ballast to a depth of 12 in. below the sleepers and leave the formation trimmed to a suitable fall towards the drains.

Ballast consolidation

The high density of traffic and high speeds required make it essential for the engineer to clear speed restrictions in a minimum amount of time. To aid him in this respect, after the formation has been laid and before the track is laid, vibrating machines may be used to consolidate the ballast to a required level. The track is then laid and fully ballasted and a rail-borne mechanical tamping machine used to pack the sleepers to correct longitudinal level. After some weeks under normal traffic, further consolidation of the ballast takes place and the final "top" is achieved by measured shovel packing, meticulously carried out.

As rail joints occupy a minimum of 60 per cent of the maintenance men's time, the first and essential step is to eliminate joints by installing continuously-welded rails.

On the Eastern Region, these rails are made up in lengths of 300 ft. at a welding plant from five 60-ft. 0 $\frac{1}{8}$ -in. length rails delivered from the rolling mills, flash-butt welded together. Of these lengths 38 are loaded on a train for delivery to site. There the lengths are laid at the lineside, by cantilevered cranes attached to the wagons, ready for installation.

Continuously-welded rails

Subsequent to the track being laid with normal 60-ft. rails on 28 Jarrah or 24 concrete sleepers, re-railing is carried out with 300-ft. rails. These are laid just clear of the sleeper ends and, after removal of the standard 60-ft. rails, are placed in the baseplates, care being taken that the rubber-bonded cork rail pads are correctly positioned. Rail ends should overlap slightly to allow for exact cutting of a Thermit-welding gap to enable site welds to be made. The continuously-welded rail is then completed by the site welds and the fittings of insulated fishplates, where required.

When each half-mile of continuously-welded rail has been assembled, it must be stress-free before fixing down, no matter what the rail temperature. This is accomplished by mounting the whole length on rollers and fixing down from the centre outward. Where the natural rail temperature is below the limits 65 deg.-80 deg. F., rail warmers must be used to achieve this temperature artificially. This point is further developed later. If the continuous length exceeds half a mile, it is divided into sections of about half a mile and dealt with as

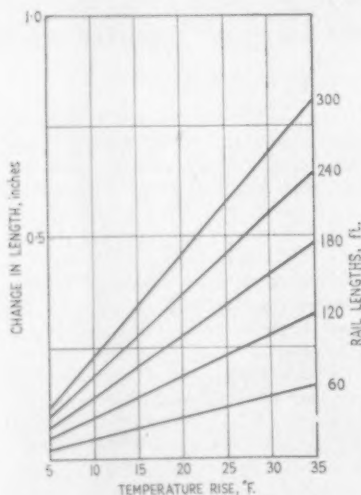


Fig. 2—Graph showing variation of rail lengths and required temperature changes for free rail

already described, after which the last welds joining the sections can be made.

After traffic has been passed over continuously-welded rails, some imperfections may be seen on the running surface at the flash-butt welds, and, to obtain full benefit from the welded rails, these imperfections are removed as soon as possible after installation by carefully surface-grinding the welds in the track.

When continuously-welded rails are installed or cut and re-welded for any reason outside the temperature range 65 deg.-80 deg. F., it is necessary to bring them within this range before fastening down.

In the case of a rail temperature above 80 deg. F. it is at present necessary to wait for the temperature to fall naturally within the range, although the possibility of artificially cooling the rails is being investigated, and tests are imminent.

Where the rail temperature is below 65 deg. F., rail warmers are used and have been developed by the Eastern Region for raising the temperature as required.

Each complete set of rail warmers can deal with a quarter-mile of track at one time. Each section to be warmed is fixed at one end by the normal fastenings over a length of 30 ft., the remainder raised on rollers placed in the baseplates at 10-yd. intervals, the pads being removed from the baseplates at roller positions.

The warming commences at the free end, working at a steady rate of about 40 ft. per min. On reaching the fixed end, the warmers return at once, at whatever speed is necessary to raise the temperature to the required degree. In normal conditions, it takes approximately 3 min. to raise 60 ft. of track through a temperature range of 20 deg. F.

Assessing temperature rise

The actual temperature rise is assessed by measurement of the expansion of the free rail. Before warming commences, datum clips are attached to the foot of the rail at 100-yd. intervals, set against the side of a baseplate. At the same time, the natural rail temperature must be obtained by rail thermometers, so that the required extension can be decided. As the rail expands and carries the clips with it, the movement is measured accurately with a steel rule.

Fastening down of the continuously-welded rails begins at the fixed point as soon as the required extension has been obtained over the first 100 yd., both rails being secured simultaneously.

The graph on the previous page provides a convenient way of determining the extension or retraction required for any temperature change over various lengths of rail. The movement over other lengths is obtained by simple addition.

Normal maintenance procedure applies equally to track with continuously-welded rails except that no work which

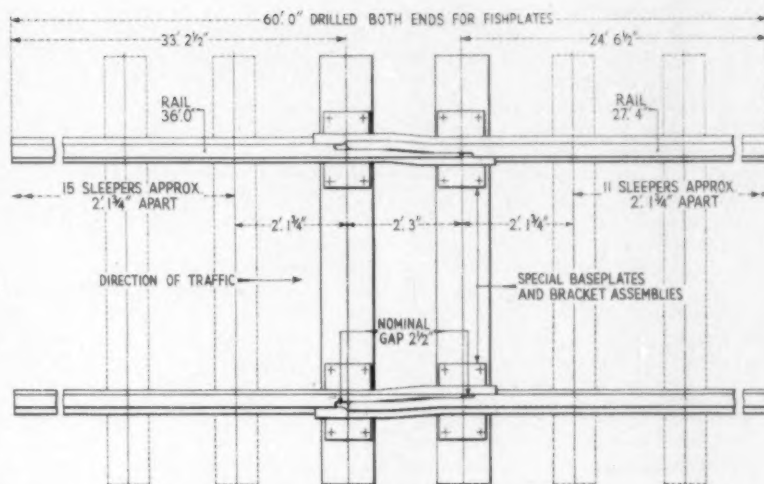


Diagram of expansion switch, showing nominal $2\frac{1}{2}$ -in. expansion gap on each rail

disturbs the sleepers or ballast is allowed when the rail temperature exceeds the working temperature limit of 85 deg. F. Not more than 15 alternate cribs are to be opened out at any time.

Rail thermometers are mounted at half-mile intervals where there is continuously-welded rail. The sites chosen should be comparable from the point of view of sunlight, ventilation, etc., with the rail in the track.

Expansion switches

Expansion switches when laid in with continuously-welded rails are readjusted back to the normal $\pm 2\frac{1}{2}$ -in. gap when either of the gaps is reduced to less than 1 in. with a minimum rail temperature of 45 deg. F.

Ballast is at all times maintained to the specification set out in a standard code of practice issued by this Region. No weakening of the ballast shoulder by digging trenches, etc., is allowed without the special authority of the engineer.

Successful experiments have been made on this Region with a view to eliminating joints in trap points which have to be installed in continuously-welded track. This is done by transferring the stress from one continuously-welded rail to another through the trap points as shown on the drawing, by the use of stress distribution bars bolted from one continuously-welded rail to another. A further development of this is being carried out with switch-and-crossing work, the stresses being transferred from the switch side of the turnout to the stock rail in a similar manner to that done in the case of trap points. In the near future, it is probable that breather switches will be dispensed with entirely and, in the foreseeable future, it is the aim on this Region, to install continuously-welded rails which will extend over very long distances.

The total length of continuously-

welded rail laid on this Region to date, is 125 miles, out of a grand total on British Railways of 360 miles.

On certain lines where for a variety of reasons it is not possible to install continuously-welded rails, 180-ft. rails which enable two joints out of three to be eliminated are being used.

In this era of continuously-welded rails, sleepers must last much longer than previously; Jarrah timber and concrete are being used on the Eastern Region.

New types of fastenings are being devised which require far less maintenance than the old.

On secondary lines on the Region, track is now being laid without baseplates as follows:—

(a) Secondhand B.S. 110 flat-bottom rails laid on tapered rubber pads to an inclination of 1 in 20 and fastened to the sleepers with T4 type elastic spikes.

(b) New B.S. 110A flat-bottom rails laid on adzed sleepers, the adzing being to the inclination of 1 in 20. These rails are also fixed to the sleepers with T4-type elastic spikes.

In the case of (b), sleepers are of 9-in. x 6-in. Jarrah timber.

High-speed two-way working

Preliminary investigations are being carried out by this Region for the use of high-speed connections required for two-way working. This method of working is commonplace on Continental railways, and it has obvious possibilities in obviating bottlenecks at difficult places, i.e., viaducts and tunnels, where the capital cost of carrying out duplication or quadruplication of track works is excessive. This will require high-speed cross-overs and junctions, together with extra signalling works.

High manganese cast crossings have

been used extensively on this Region for the past two years at major termini and heavily-worked junctions. Over 80 per cent of the switch-and-crossing work at Liverpool Street Station and the outlying junction at Bethnal Green has been re-laid with rolled manganese switches and cast crossings and have proved successful. The use of these cast crossings has two major advantages: (1) the slow wearing qualities of the steel under dense traffic extend the life of the crossings three to four times, and (2) the elimination of crossing bolts and other loose fittings which have required a very great amount of maintenance in the past.

At Retford on the East Coast main

in this direction is being extended.

It is essential for the engineer to plan his track works at least 12 months in advance with all the other departments and, most important of all, with the operating department.

After the District Engineers have submitted their annual proposals of lines for renewal, and after these have been inspected, the complete programme is prepared by the Chief Civil Engineer. Possessions meetings are then arranged with all interested parties to enable the renewal work to be carried out with the least possible interference with the published timetable. If the East Coast main line is concerned, the possessions

public timetable commences. The effect of this is that re-laying proposals are now inspected far in advance of the date of renewal, e.g., autumn inspections are held in any given year for work to be carried out during the next year but one.

The renewal of standard plain line is generally carried out with a twin-jib tracklayer with the use of prefabricated 60-ft. lengths of track. This necessitates the total occupation of two lines. It is expected in the very near future to obviate many double-line possessions by the use of a single-line tracklayer now undergoing trials on this Region. Before general re-laying, it is sometimes necessary either to blanket or deep ballast,

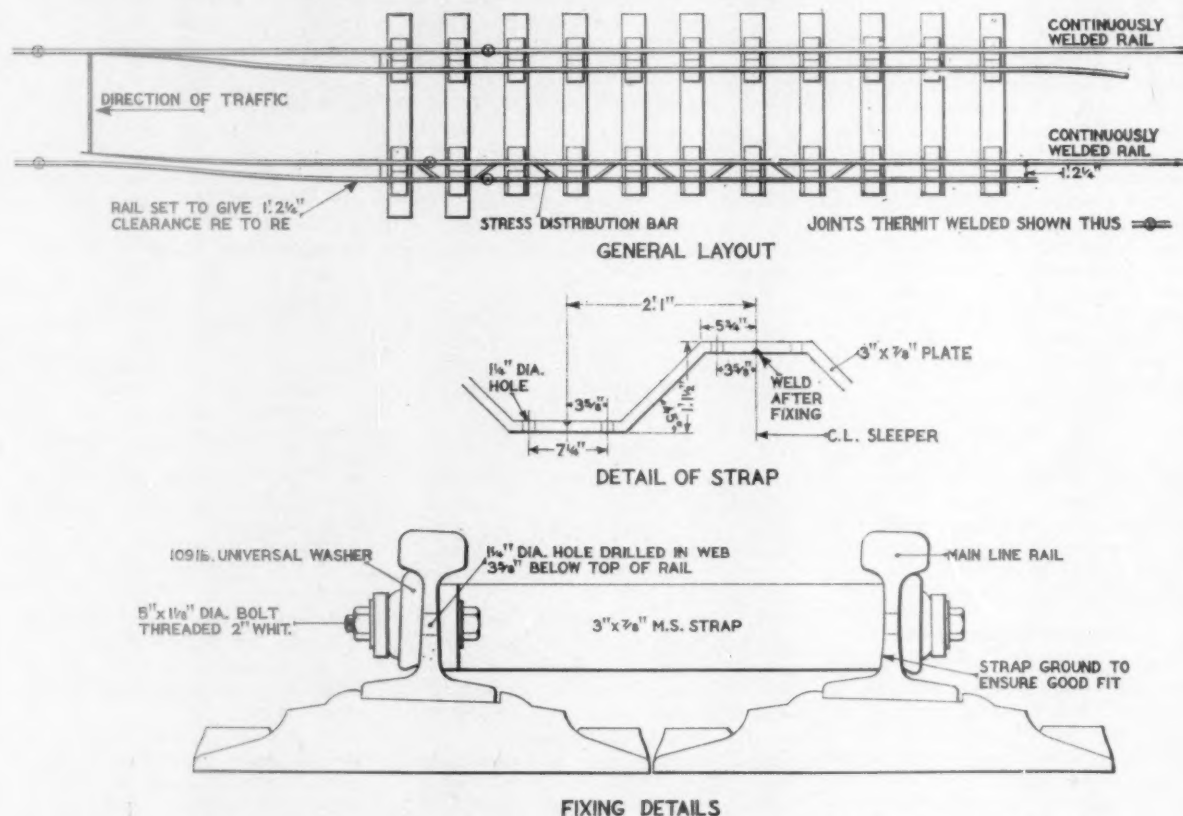


Diagram illustrating method of transferring stresses from one continuously-welded rail to another through track-points

line, where the Great Central line crosses on the level, it used to be necessary to change at least one rail a month and completely to renew the whole crossing every 12-18 months. In October, 1958, the crossing was re-laid with high manganese steel units and to date these are giving satisfactory service. Recently, the level crossing at Newark, again on the East Coast main line, was also re-laid with cast high manganese steel units.

Initial experiments have been successful in the repair by welding of high manganese steel switch-and-crossing work on this Region, and work

meetings must include representatives from the North Eastern and Scottish Regions as through expresses will be affected when major works affecting the permanent way are undertaken on any of these Regions.

The result of these meetings allows adjustments to be made in the Line Traffic Manager's timetable to give the recovery time necessary to maintain a regulated flow of traffic.

Possessions charts

Possessions charts are required to be in the hands of the Line Traffic Managers at least six months before the relevant

or to ballast-clean the track. This is generally carried out during the week-ends preceding re-laying.

For good running on the permanent way it is essential for the line and level of the track to be maintained within fine limits. There is no substitute, so far, for the method of manual measured shovel-packing to produce first class results for high-speed traffic. Efforts are being made to devise a procedure incorporating lifting to a true top in the latest tamping machines. A method of this type would considerably reduce the duration of temporary speed restrictions which are the aftermath of re-laying.



Bitumastic felt being laid to eliminate pumping of clay into track formation

It can be said that the vast majority of the work carried out on the permanent way soon will be done mechanically but it is still essential to have first class supervision to co-ordinate the machines and use them to their best advantage.

Ballast train working

It is the practice of the Eastern Region in the main to use furnace slag for track ballast because of its cheapness and ready availability within the Region. This ballast is mainly supplied from the steelworks at Scunthorpe in Lincolnshire.

During 1961, the Eastern Region will require more than 600,000 tons of slag ballast to keep pace with maintenance and modernisation.

In the past, it was left to the District Engineers to arrange their ballast trains in conjunction with a ballast inspector at Scunthorpe but this system was found to be wasteful of wagons and time, and it was decided to overhaul and streamline all the Chief Civil Engineer's traffic arrangements. A traffic organisation within the Chief Civil Engineer's Department was therefore set up to arrange the proper time-tabling of trains and to improve the turn-round of the service fleet.

Today, the District Engineer submits his estimated requirements to the Chief Civil Engineer four weeks in advance, weekly adjustments being made in the week preceding the actual work. This enables the Traffic Officer to plan his trains one week in advance which gives him time to arrange with the operating departments the required number of trains, timing, loads, and destinations. With minor exceptions, all trains are on the basis of block train-loads routed



Transport of 30-ft. welded rails

direct to the nearest available sidings to the site of work. When the ballast train has been emptied on site it is moved to the nearest pick-up sidings by the engineer's ballast engine and then returned by the Operating Department to the slag depot, as a block train.

Working without full possession

On occasions, it is necessary to ballast a site during the week without a full possession of the line. In these cases, the Traffic Officer arranges a hopper train which is worked as a fast freight and run quickly to the site, moving over the work between ordinary trains at 10 m.p.h., and after emptying (which takes 20 to 30 min.), returning direct to the slag depot—still as a fast freight.

In the Eastern Region, spoil which is

produced as a result of track ballast-cleaning, blanketing, etc., is dealt with at two main Region tips at Parkeston, Essex, and Conington, Huntingdon, respectively, with a subsidiary tip at Whittlesea in Cambridgeshire.

In principle, the tip at Conington deals with all spoil from the Great Northern area, and the tip at Parkeston and its subsidiary at Whittlesea deal with the spoil on the Great Eastern area, including the London, Tilbury & Southend line. In practice, it is sometimes necessary to keep a balance in discharge, to cross-route spoil trains between the Great Northern and Great Eastern areas. To maintain an even flow of trains for discharge at each tip, the District Engineers submit a forecast in advance of their weekend working to the Chief Civil Engineer of the amount of spoil to be produced. The Traffic Officer is then able to arrange for the supply of wagons to the jobs, and for the movement of spoil trains for discharge to the appropriate tips.

Future developments

Much has been said of machines, and many developments are in hand of machines which can line, re-lay, and clean the track and improve track drainage. These machines are being used on the Region and will soon become commonplace.

Machines of this type can be fully justified only if they work on weekdays as necessary as well as at weekends, and this is an objective which this Region keeps constantly in mind.

It is confidently expected that far less day-to-day maintenance will be neces-



Cast manganese steel crossing

sary on the track of the future and this will mean a rearrangement of maintenance gangs into mobile units rather than the present-day localised gangs.

There is ample evidence that extremely high standards are being attained—far higher even than those of the very high-speed Anglo-Scottish services.

TOKENLESS BLOCK WORKING on single-line sections

As a rule, trains on the Indian Government Railways are operated on the absolute block principle. The system employs block instruments to ensure that only one train travels on the line between two adjacent stations or signalboxes.

On single lines, token instruments are in operation consisting of Neale's Ball Token, Tyers Tablet, Tyers Key Token Instruments, and train-wire (Morse) circuits. Only one token can be extracted at a time and this is done by joint manipulation of block instruments at each end of the section. The driver must be in possession of the token before he can take his train over the single line.

Time delay

In recent years, attention has been given to the time lost in carrying the token brought in by a train driver to the station-master and the time required for subsequent operation of the block instrument to obtain a fresh token for the driver of the crossing train. Observations have shown that this delay is from seven to twelve minutes.

To increase the capacity of these single-line sections, of which India has over 31,000 miles, experiments are being conducted with tokenless block instruments. These have been introduced on the South Eastern Railway, where they have been installed on the Khurda Road-Nergundi single-line section on the east coast.

System devised to save time and thus increase capacity on branch lines

This section is already overloaded and it is estimated that, by the use of tokenless instruments, two more trains can be fitted in the timetable for this section.

In 1958, a traffic survey of the section was necessitated by the peculiar problems arising in this area as a result of the additional traffic brought in by the Nergundi-Talcher and Khurda Road-Puri branches. The presence of several major bridges made the cost of doubling the line prohibitive, and tokenless working was investigated as a possible solution.

Selection of instrument

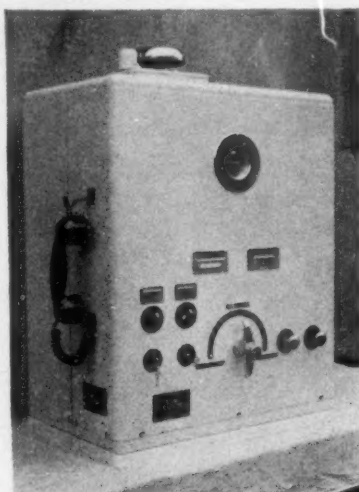
Various types of tokenless instruments were obtained and examined by the Research, Design & Standards organisation of the Ministry of Railways at New Delhi. Specifications were drawn up incorporating the best features of the various examples under examination. Instruments to this specification were supplied by a Japanese company at a cost of about £220 each. Provision has been made in the instruments for later conversion to double-line block working if this proves desirable.

Outdoor equipment essential to the system includes track circuits or treadles, and it is claimed that lock-and-block facilities are provided by tokenless instruments. Advantages are as follow:—

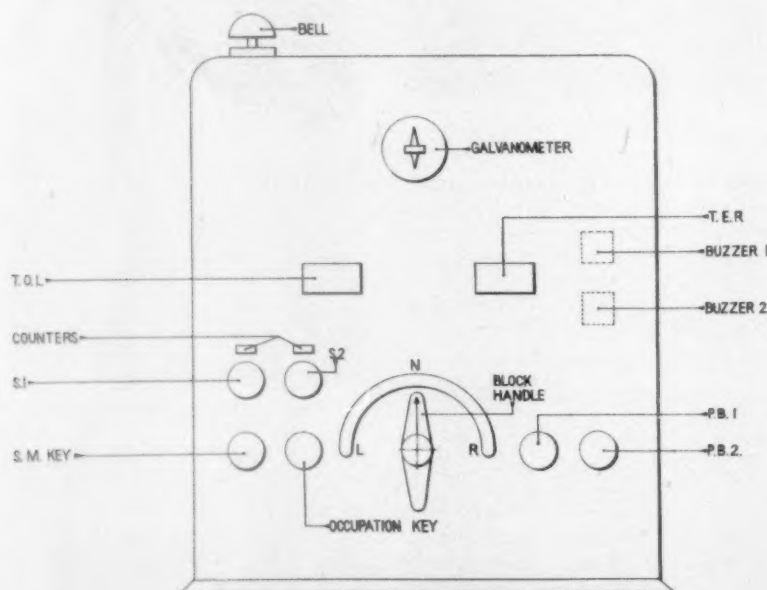
- 1 The starting signal cannot be lowered unless line clear is obtained through the block instrument concerned;
- 2 The starting signal is returned to danger as soon as the train passes it and the signal remains locked until a second line clear is obtained;
- 3 As soon as a train enters the block section, an audible and visual indication is established at both sending and receiving ends;
- 4 Home signals lowered for the reception of a train are automatically returned to danger as soon as the last vehicle on the train has passed them;
- 5 Audible indication is given at the receiving end when a train arrives.

Experimental basis

Installation of tokenless instruments on the Khurda Road-Retang section (two stations on an experimental basis) will not materially affect line capacity but the project is experimental. Arrangements are being made to install instruments throughout the Khurda Road-Nergundi section (seven intermediate



Tokenless block instrument (see diagram below)



Arrangement of parts on operating plate

stations), together with multiple-aspect, lower-quadrant signalling, a modification of the existing two-aspect signalling.

The table at the end of this article shows how the system operates. Meanings of abbreviations and terms used are given below, and are related to the diagram showing the arrangement of parts on the operating plate given at the beginning of this article.

P.B.1—Push-button for bell signals.

P.B.2—Push-button for sending release to block handle of opposite instrument.

S.1—Switch for cancellation of "Line Clear" by the sending station after "Line Clear" has been obtained from the receiving station.

S.2—For cancellation of "Line Clear" by the sending station after the train has entered the block section and returned to the sending station received on proper signals.

S.M. key—Stationmaster's key. Removal of this key makes the instrument inoperative but does not disconnect the telephone.

Occupation key—Will be carried by the driver of a shunting train. The key can only be taken out when the block handle is in the "Line Closed" position. The instrument is inoperative while the key is removed. The telephone can be used.

Buzzer 1—For audible indication at both stations when a train enters the block section.

Buzzer 2—For audible indication at the receiving station when the whole of the train passes within the home signal.

T.O.L. train on line indication—Visual indication at both stations when a train enters a block section.

T.E.R. time-element relay operation indication—Visual indication after a predetermined time of two minutes when the cancellation of "Line Clear" is made possible.

Number counter—Two number counters, one attached to each switch, S.1 and S.2, for counting each cancelling operation.

Galvanometer—Detects flow of current between instruments.

Block handle—The block handle can be set at "N" ("Line Closed"), "L" ("Train Going To"), and "R" ("Train Coming From") position and locked by the block-lever lock. It can only be turned from any of the three

positions when a frequency shift alternating current is received from the opposite instrument.

Bell—Single-stroke bell for exchange of standard bell code.

Telephone—The "Call-Attention" signal is used for telephone conversation.

NEW WORKS FOR VICKERS LIMITED

Vickers Limited is to erect and equip, at an approximate cost of £A1,500,000, a heavy engineering works at Port Kemble, Australia, close to the works of the Australian Iron & Steel Limited, and capable of manufacturing a wide range of local requirements.

Operation of instruments despatching a train from "A" to "B"

"A" Station	"B" Station
Block handle in "Line Closed" position. All signals and signal levers normal	Block handle in "Line Closed" position. All signal and signal levers normal
1. S.M.'s key inserted and turned	3. S.M.'s key inserted and turned
2. Button P.B.1 pressed: "Call-Attention" code of bell signals sent	4. "Call-Attention" code acknowledged by pressing button P.B.1
5. "Attend Telephone" code of bell signals sent	6. "Attend Telephone" code acknowledged: telephone attended
7. "Line Clear" asked for on telephone	8. "Line Clear" enquiry accepted
9. "Is Line Clear?" code of signals sent through button P.B.2, and button remains pressed on last beat	10. Block handle turned to "Train Coming From"
11. "Is Line Clear?" code of bell signals acknowledged through button P.B.2, and this is kept pressed on last beat	
12. Block handle turned to "Train Going To" and "Line Clear" acknowledged	
13. (a) Advanced starter signal cleared (b) Train enters block section (c) Advance starter signal returns to "On" position (d) "Train On Line" indication appears automatically (e) Buzzer begins to operate (f) Levers of starter and advanced starter signals returned to normal position	14. "Train On Line" indication appears automatically and buzzer begins to operate
15. "Call-Attention" code sent through button P.B.1	16. "Call-Attention" code acknowledged through button P.B.1
17. "Train On Line" code of bell signals sent	18. "Train On Line" code of bell signals acknowledged through P.B.1 and kept pressed on last beat. Buzzer stops
19. Buzzer stops	20. (a) Reception signals cleared (b) Train enters station (c) Buzzer begins to operate (d) Reception signals replaced to "On" position automatically (e) Reception signals levers replaced to "Normal" position
21. "Call-Attention" code of bell signals sent through P.B.1	21. "Call-Attention" code of bell signals sent through P.B.1
22. "Call-Attention" code acknowledged	23. "Train Arrived" code of bell signals sent through P.B.2 and this is kept pressed on last beat
24. Block handle turned to "Line Closed" position	
25. "Train Arrived" code of bell signals sent through P.B.2 and this is kept pressed on last beat	26. (a) Block handle turned to "Line Closed" position (b) Buzzer stops

RAILWAY MODERNISATION in Western Australia

IN ADDITION to prospective gauge-conversion and other major engineering works, several traffic developments of note are being sponsored by the Western Australian Government Railways administration. These are mainly directed toward giving the south-western and southern parts of the State greatly improved freight services—including next-morning delivery—and luxurious passenger train and railway-owned and worked bus services.

Two special express goods trains, providing fast overnight services between Perth and south-western districts centred upon Bunbury, about 100 miles to the south, were recently introduced. They officially received the names of "South West Enterprise" and "Capital City Freighter" for the Down train from Perth and the corresponding Up train respectively, the naming ceremony being performed by the Commissioner of Railways, Mr. C. G. C. Wayne.

Next-morning delivery

Goods presented at Perth goods shed before 4 p.m. daily are despatched by the "South West Enterprise" and are available for delivery in Bunbury by 8 a.m. next day, and at more-distant towns between 8 a.m. and early afternoon. This service enables a wagon-load consisting of many tons of assorted goods to be delivered in the south-west as quickly as a letter. South-west traders can place orders in Perth on one day for next-morning delivery in their home towns.

Similarly, in the opposite direction, the "Capital City Freighter" makes it possible for fruit, meat, and other perishables to be railed from Bunbury in the late evening and arrive in Perth next morning before 5 a.m. Feeder services from further towns by either fast goods train or Railway Road Service connect with the "Capital City Freighter" at Bunbury.

Modern rolling stock for perishables

The latest rolling stock is used on both these fast trains, including the new "VF"-type semi-louved covered vans, specially designed for fast, clean, transport of perishables and other urgent traffic. Their design includes high-speed bogies enabling these vans to be run at maximum speeds, and louvre ventilators so placed as to ensure ample air-circulation. Moreover, brakevans on both trains are of a new type with separate ice-cooled

compartments for specially-perishable goods such as meat, milk and butter.

For perishables in greater bulk the large "WA" class all-steel refrigerator vans are run in the "Capital City Freighter" for dairy products and meat from south-west factories and farms to metropolitan distributors and to ships for export.

Another service in the south-western districts is one of scheduled heavy road vehicles consisting of 5-ton trailers towed by 30-cwt. lorries or jeep-type cars. They run on specified routes taking the trailers to various points, whence they are towed onward by the farmers to their properties. After unloading, the trailers can be returned to pick-up points full or empty. Alternatively empty trailers can be detached as required en route. This system obviates long hauls by clients to railheads and double-handling.

Bulk goods door-to-door service

The Government Railways administration has also introduced a new bulk-goods system. In co-operation with transport agencies and carriers it offers fast, reliable carriage of such commodities as groceries, hardware and other goods. A nominated forwarding agent collects the merchandise from warehouses or stores, or alternatively firms take goods directly to agents' warehouses for delivery to railhead. The agent bulks the goods into wagonloads and consigns them by rail to approved local carriers in country districts. On arrival, the goods are transferred promptly from rail to road for delivery to the door.

Railway rates are reduced per ton above a prescribed minimum according to tonnage consigned, and the most efficient use is made of rail and road services, rail for heavy and long-distance haulage, road for initial and final door-to-door delivery. The system offers the same speedy door-to-door delivery to the small storekeeper as to the large firm.

Bulk loading, together with trains such as the "South West Enterprise," ensures that goods ordered one day are delivered to the clients' door early the next. Because of this speedy and regular transport, many trading concerns can

Express goods trains, luxury passenger and bus services

avoid the expense of holding large stocks.

Albany, 340 miles by rail from Perth, will have improved rail and road services when the Railway Department introduces its modernised "Albany Progress" passenger train and *de luxe* omnibuses this month. There will be a daily passenger service, either by rail or road, in each direction between Albany and Perth. The "Albany Progress" will set a high standard in passenger comfort, its sleeping cars being tastefully furnished and having carpeted floors.

Second class sleeping accommodation

For second class passengers the two-berth sleeping compartments will be a popular innovation. These cars have been rebuilt and provided with sponge-rubber mattresses and wide-vision windows.

First class sleepers have been refurbished and are equipped with wardrobes, fans, and ice-water service.

The buffet-saloon car features a modern buffet where hot snacks will be served, avoiding the necessity for refreshment stops. An Australind-type lounge, with tables, is adjacent to the buffet, and there is sit-up accommodation for second class passengers and a separate compartment for parties or women travellers.

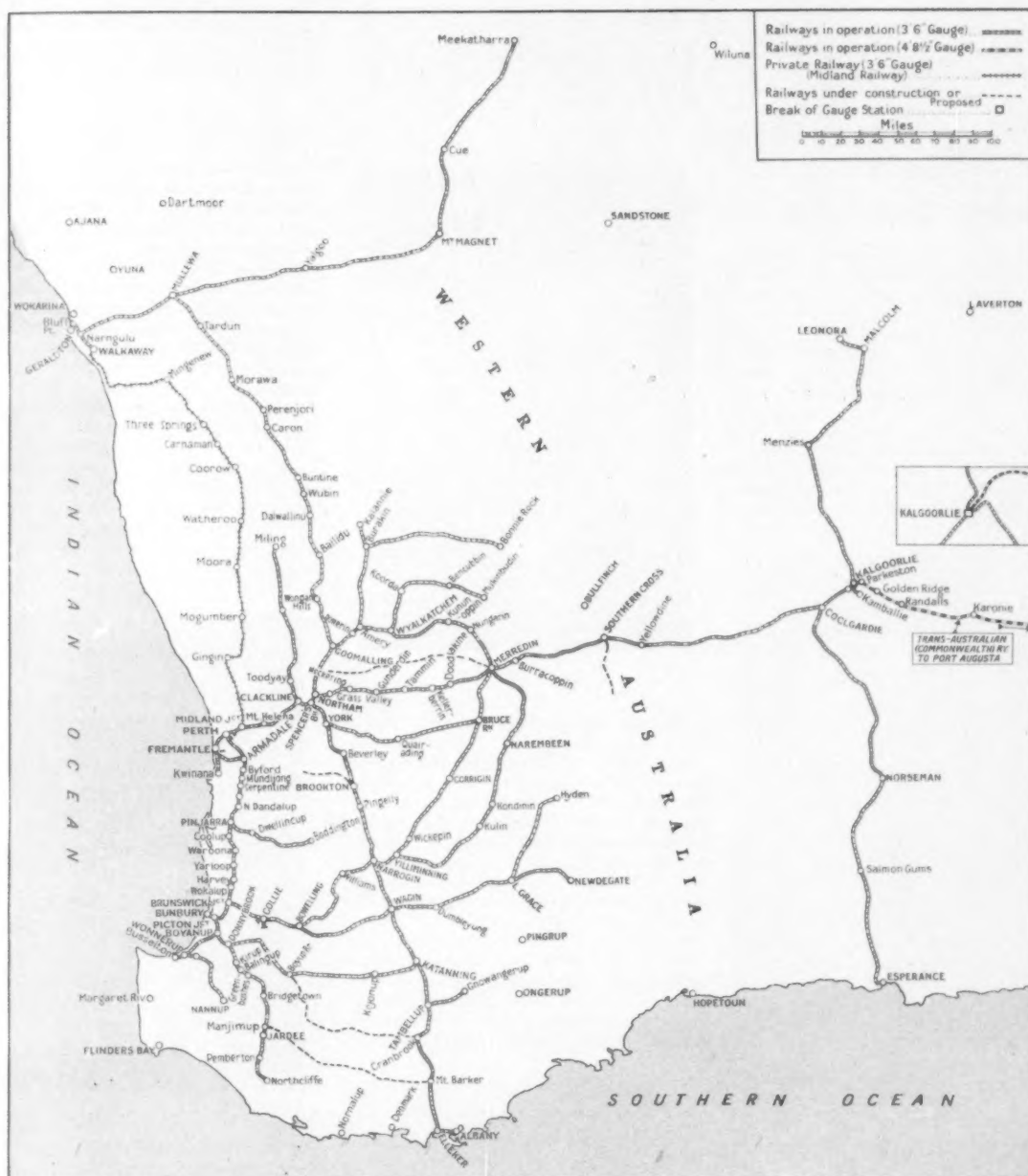
Modern pastel tonings, laminated plastic walls, and quilted plastic and stainless steel set a high standard of comfort and appearance. Loudspeakers, with separate volume-control, will give music and radio programmes.

Freight and bus services

On the days when passenger trains do not run, an express freight service will operate from both Perth and Albany.

These trains will run on an accelerated schedule and give prompt delivery of perishables and other traffic between Perth and stations situated between Narrogin and Albany as well as on the branch lines between these two points.

New railway buses for the Perth-Albany run of a luxury type not seen previously in this State will be introduced this month. They have an upper deck for scenic viewing, and will carry a hostess. Additionally, sleeper chairs are comfortably upholstered, and there



Western Australian Government Railways

is a buffet for light refreshments and toilets are also provided.

These buses have the latest devices including air-bag suspension to ensure perfect riding. The raised deck body provides ample locker space for luggage under the seat deck. Passenger windows are of the aluminium-framed clipper type with tinted safety glass.

Passenger amenities

Individual lights, each with its own switch, are fitted into the luggage-rack above each passenger, and there are ten speakers from a transistorised public address system. Ceiling lining is a plastic

fabric. The buses are well ventilated for summer and heated for winter. They will do the 253 miles by road between Perth and Albany in seven hours.

Novel ventilation

The raised-deck type of body on these new buses gives ventilation to the coach. The front section, or roof, of the raised deck is set back and used as an air scoop. The impacted air is taken by ducts through hollow fibre-glass internal luggage racks with a controllable air-outlet above each passenger.

In the buffet compartment, caravan-type fixtures, cupboards, and a plastic

sink are fitted. There are three stainless-steel thermos or vacuum flasks for hot water, tea and iced water. These are below the floor and have spring-loaded taps. Fine plastic cups and saucers with tray will be used. Small bottles of soft drinks and pre-prepared sandwich packs will be sold.

Editorial reference is made to the system's financial results on page 671.

ROME-MOSCOW THROUGH SERVICE

On May 28 a 2½-day rail service was inaugurated between Moscow and Rome, the through carriage travelling via Poland, Czechoslovakia, and Austria.

PERSONAL

Queen's Birthday Honours List

The following is a selection of Honours of transport interest from the Queen's Birthday Honours List:—

Baron

GENERAL SIR BRIAN ROBERTSON, BART., G.C.B., G.B.E., K.C.M.G., K.C.V.O., D.S.O., M.C., formerly Chairman, British Transport Commission.

Knight Grand Cross—G.B.E.

SIR IVAN A. R. STEDEFORD, K.B.E., Chairman & Managing Director, Tube Investments Limited. He was Chairman of the Transport Planning Board which produced the Stedeford Committee Report.

C.M.G.

MR. C. T. HENFREY, formerly Chief Engineer, East African Railways & Harbours.

C.B.E.

MR. A. DEAN, Assistant General Manager (Modernisation), York, British Railways, North Eastern Region.

MR. G. A. WHIPPLE, Chairman & Managing Director, Hilger & Watts, Limited.

MR. C. F. BARNARD, Executive Vice-Chairman, Mirreles Bickerton & Day, Limited.

O.B.E.

MR. W. G. HUNT, Department of Chief Mechanical Engineer, Ministry of Transport.

MR. C. S. MCLEOD, Director of Industrial Relations, British Transport Commission.

MR. R. W. OSGATHORPE, Industrial Relations Officer, East African Railways & Harbours.

M.B.E.

MR. A. J. BRAWN, Divisional Estate Officer & Estate Adviser, British Transport Waterways.

MR. C. J. BUSBY, Manager, Swindon Branch, Western Division, British Road Services.

MR. C. DOVE, Secretary, North Western Area, Transport Users' Consultative Committee.

MR. J. H. MARSHALL, Higher Executive Officer, Ministry of Transport.

MR. A. L. MOHAMED, Clerk, East African Railways & Harbours.

MR. S. G. PURKISS, Clerical Officer, Ministry of Transport.

B.E.M.

MR. J. MILLER, Stationmaster, Oxford, Western Region, British Railways.

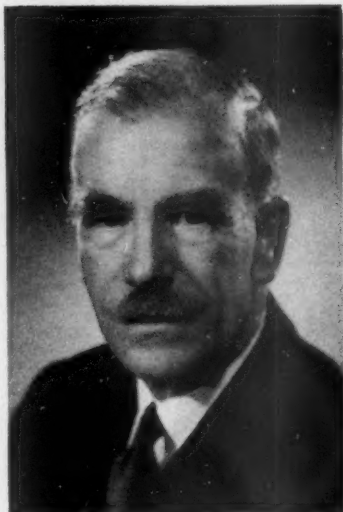
MR. W. D. CHOPPING, Goods Guard, Eastern Region, British Railways.

MR. D. J. FREELAND, Conductor, Victorian Government Railways.

MR. A. IRONS, Supervisory Foreman, Paddington Goods Station, Western Region, British Railways.

MR. J. P. JOYCE, Permanent Way Inspector, East Africa High Commission.

MR. C. J. PULLEN, Chief Locomotive Running Inspector, Paddington, Western Region, British Railways.



Sir Brian Robertson

GENERAL SIR BRIAN ROBERTSON, BART., G.C.B., G.B.E., K.C.M.G., K.C.V.O., D.S.O., M.C., until recently Chairman of the British Transport Commission, and who has joined the board of the Dunlop Rubber Co. Ltd., has been awarded a Barony in the Queen's Birthday Honours List. Sir Brian Robertson was Managing Director of Dunlop South Africa Limited from 1935 to 1939. A biography was published in our March 24 issue.

SIR IVAN A. R. STEDEFORD, K.B.E., Chairman & Managing Director of Tube Investments Limited, and former Chairman of the Transport Planning Board who has been awarded the G.B.E. in the Queen's Birthday



Sir Ivan A. R. Stedeford

Honours List, was educated at Shebbear School, Devon. At the age of 17, he became an apprenticed pupil with the Vickers Group, completing a full five-year practical course in mechanical engineering. In 1928 he became Sales Director of Tubes Limited. In 1933 he was elected to the board of the parent company, Tube Investments Limited. He became Managing Director in 1939 and, while retaining the Managing Directorship, was elected Chairman in 1944. He was created a K.B.E. in 1954. He is on the boards of the Commonwealth Development Finance Co. Ltd. and of the National Provincial Bank.

MR. C. T. HENFREY, A.M.I.C.E., formerly Chief Engineer of East African Railways & Harbours, who has been awarded the C.M.G. in the Queen's Birthday Honours List, entered the service of the Railway Administration in 1935 as an Assistant Engineer,



Mr. C. T. Henfrey

having previously served with the Public Works Department, Kenya, for nine years. From April, 1946, he acted as District Engineer, Lake Engineering District. He became District Engineer in January, 1947. Early in 1949, he was promoted to be Acting Senior District Engineer at Railway Headquarters, Nairobi, and, by the end of that year, his rank was substantiated and he assumed the duties of Resident Engineer responsible for the Nairobi-Nakuru realignment. In 1951 he became New Works Engineer, and, in 1952, Way & Works Engineer. Subsequently he became Assistant Chief Engineer, and was promoted to be Chief Engineer in September, 1954, and retired from that position in October last year.

MR. A. DEAN, M.Sc., D.I.C., M.I.C.E., Assistant General Manager (Modernisation), York, British Railways, North Eastern Region,

who has been awarded the C.B.E. in the Queen's Birthday Honours List, was born in Halifax, Yorkshire. Mr. Dean was educated at Halifax Council Secondary School and Municipal Technical College, where he took an honours (1st Class) B.Sc. in Engineering. He was awarded a Royal Scholarship to the Imperial College, London, where he undertook post-graduate work at the City & Guilds Engineering College, and was awarded the Diploma of the Imperial College. Continuing post-graduate research, he gained his M.Sc. (London). Mr. Dean joined the Civil Engineering Department of the Southern Railway in 1924, and after experience in various positions was, in 1939, appointed Divisional Engineer (London East). In 1942, he became Maintenance Engineer, Southern Railway, and in 1946 Assistant Chief Civil Engineer. On Nationalisation of the railways in January, 1948, he was appointed Chief Officer, Engineering (Works), Railway Executive, and in 1951 moved to the North Eastern Region as Chief Civil Engineer. Mr. Dean is a Member of the Council of the Institution of Civil Engineers, a Past-



Mr. A. Dean

President of the Permanent Way Institution and a Member of the Civil Engineering Panel of the Yorkshire Council for Further Education.

MR. C. S. MCLEOD, M.INST.T., Director of Industrial Relations in the Manpower Adviser's Department, British Transport Commission, who has been awarded the O.B.E. in the Queen's Birthday Honours List, joined the London & North Eastern Railway as a Traffic Apprentice, in 1927. After the normal training and subsequent experience in staff work in the Chief General Manager's Office, he was appointed Assistant to the District Goods & Passenger Manager, Dundee, in 1935, and Assistant to the Goods Manager, Glasgow, in 1938. Later he became Assistant Goods Manager, Scottish Area, L.N.E.R., and during the 1939-45 war acted as Goods Manager of the Scottish Area. In 1945 he was appointed Assistant Divisional General Manager of the Scottish Area at Edinburgh, and in 1947 became Principal Assistant (Staff) in the Office of



Mr. C. S. McLeod

the Chief General Manager. On nationalisation of the railways, Mr. McLeod was appointed Assistant Regional Staff Officer, Eastern Region, and was promoted in 1951 to be Regional Establishment & Staff Officer. In 1959, Mr. McLeod became Director of Industrial Relations, British Transport Commission.

Overseas

Three new Directors have augmented the board of the Illinois Central Railroad board from 15 to 18 elected members. They are MR. HARMON S. EBERHARD, President of the Caterpillar Tractor Company, MR. FRANK E. MARTIN, Vice-President & Comptroller, Illinois Central Railroad, and MR. OTTO H. ZIMMERMAN, Vice-President in charge of operations, Illinois Central Railroad.

MR. W. G. A. WALKER, Assistant Comptroller of Stores, New Zealand Government Railways, who, as recorded in our December



Mr. W. G. A. Walker

23 issue, has been appointed Comptroller of Stores, joined the railway service in 1923 as a cadet at Wellington. He transferred to the Stores Department in the same year and after gaining experience in the office of the District Stores Manager, Woburn, he was transferred to the Comptroller of Stores' Office, in 1949, where he held the positions of Chief Purchasing Officer and Administration Officer. He became Assistant Comptroller of Stores in 1958.

MR. G. F. BRIDGES, A.M.I.C.E., A.M.N.Z.I.E., District Engineer, Wanganui, New Zealand Government Railways, who, as recorded in our December 12 issue, has been appointed Projects Officer, Chief Civil Engineer's Office, Wellington, joined the railway service in 1937 as a civil engineering cadet at Christchurch. He served subsequently as a draughtsman and as an engineer at Christchurch and Wellington. After war service he became Senior Engineer (Civil), in 1948 and served in that capacity at Hamilton, Whakatane, and Auckland, until, in 1955, he became Assistant District Engineer.



Mr. G. F. Bridges

Auckland. In 1956 he became Resident Engineer, Hamilton and, in 1958, became District Engineer, Wanganui.

British Railways

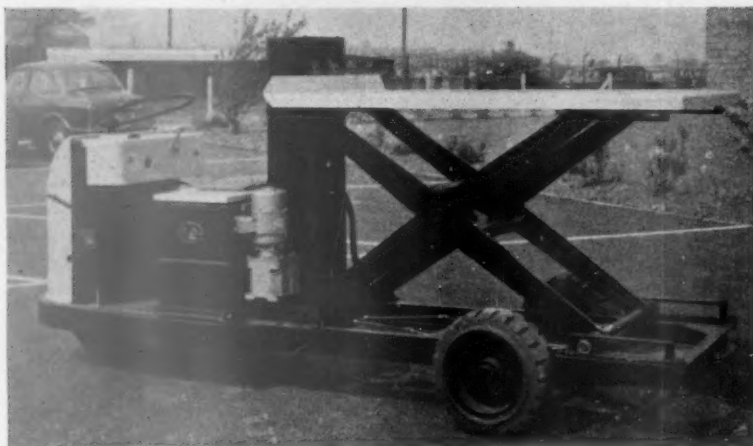
MR. T. FISKE, Assistant to General Manager, British Railways, London Midland Region, has retired.

MR. T. A. GERMAINE, Assistant Public Relations Officer, British Railways, Eastern Region, has been appointed Assistant Public Relations Officer, Public Relations Division, British Transport Commission.

Obituary

We regret to record the death on June 8th, at the age of 79, of MR. CONRAD GRIBBLE, who was, until his retirement in 1946, Deputy Chief Civil Engineer of the Southern Railway.

NEW EQUIPMENT *and Processes*



INDUSTRIAL TRUCK

A high-lift platform truck is available with a push-button-controlled elevating platform. This gives working heights from 1 ft. 7 in. to 4 ft. 1 in. The low lift is for carrying the load, the high lift for transferring it at the appropriate height to a vehicle, workbench, or machine.

The platform is raised and lowered by a single-acting hydraulic ram with two lifting chains working over rollers attached to the ram head. As a safety measure an automatic power cut-off to the truck drive comes into operation during lifting. A feature of the truck, which can carry loads of up to two tons, is its low running cost. This is estimated to be between eightpence and one shilling for a normal working day.

Dimensions are:—overall length, 10 ft. 7½ in.; platform size, 5 ft. 6 in. x 3 ft. 6 in.; turning circle radius, 8 ft. 2½ in.

The truck is fitted with Lockheed hydraulic brakes; the motor, which is completely enclosed, is series wound, to B.S.S. 173, with a one hour rating of 2.3 h.p.

Fuller details are obtainable from the Brush Electrical Engineering Co. Ltd., Loughborough.

BIRD REPELLENT

Widespread damage is done by the large flocks of birds to be found in city centres. Despite initial success with some scaring devices the birds have returned to their haunts and the problem has remained.

Railway property is often used for roosting purposes and to discourage this a repellent is shortly to be applied to the entrance of Huddersfield station.

Known as "Scarecrow Strip" this repellent is a gel which is laid in a narrow ribbon on sills and ledges. Birds alighting on the strip feel insecure, but are not trapped. They fly away and forsake their once habitual haunt.

The material is long-lasting, because it neither melts nor freezes, and has the great advantage of absorbing dirt and still remaining effective. It is reported to be harmless to birds.

Additional information is obtainable from Rentokil Products Limited, Leatherhead, Surrey.

WATER BAR

A corrugated-fibre water bar is available for application where such a bar is essential, considerations of extreme economy prevail, and no movement takes place. It is said to be suitable for construction joints in any type of concrete structure.

Manufactured from a tough, fibrous material, and mechanically pressed to produce dove-tailed corrugations, the water bar is reinforced with mild-steel strip, and dipped in pitch.

Installation is either by pre-positioning before the concrete is poured, or by forcing into the wet concrete before the final compaction is undertaken.

Fuller details are available on application to Expandite Limited, Chase Road, London, N.W.10.

WELDING EQUIPMENT

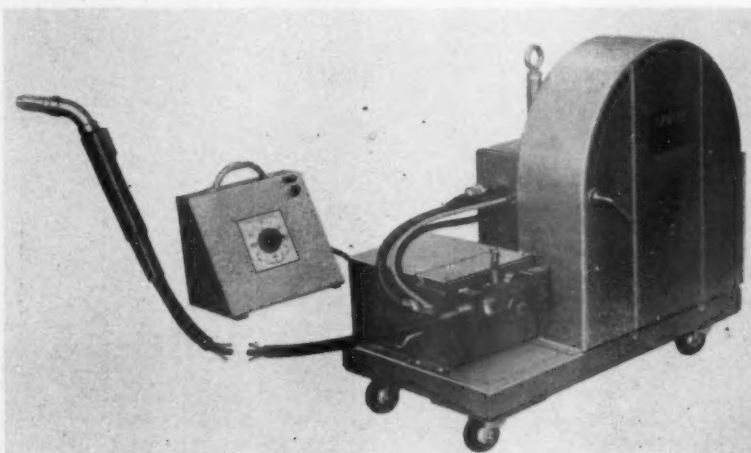
The Sprite CO₂ welding equipment is specially suited to the requirements of light-gauge sheet-metal fabricators, and for light mild-steel plate work and light gauge metal components. It is claimed to be up to 50 per cent faster than older methods of manual welding.

The Lincoln hand-welding gun, used with the Sprite CO₂ welding unit, is claimed to weld continuously in all positions down to 20g. sheet.

The welding unit incorporates an infinitely-variable wire-drive unit, wire reel with adjustable brake, and a spring-loaded mechanism to take up slack wire when the electrode is inched back prior to welding. There is a remote amperes-control box with CO₂ gas-purge operating button, and a ground clamp connected to the ground cable and the hand-welding gun.

The welding unit is capable of driving wires of ⅜ in. and ⅝ in. dia., the wire-feed speed being variable between 130 and 300 in./min. The welding current range is 60-200 amps.

Further information is obtainable from Lincoln Electric Co. Ltd., Black Fan Road, Welwyn Garden City, Herts.





TUBE BENDER

The "Staffa - Pedrick" bending machine has been introduced to produce two identical bends in parallel tube simultaneously.

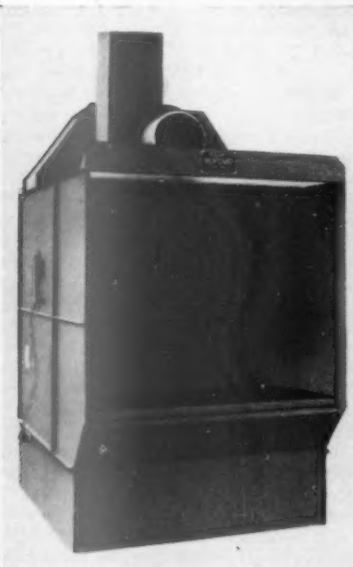
Provided with extended centre and bending arm spindles, fitted with dual sets of formers and back rollers, the bending centres of the machine are varied by collars fitted to each spindle. Spindles of different lengths are readily interchangeable.

Five sizes of machine are available, capacity varying from tube having a nominal bore of 1½ in. up to 4 in.

Additional information may be obtained from Chamberlain Industries Limited, Staffa Works, Argall Avenue, Leyton, London, E.10.

SPRAY BOOTH

A new version of the "Nopump" spray booth is announced. This is a self-



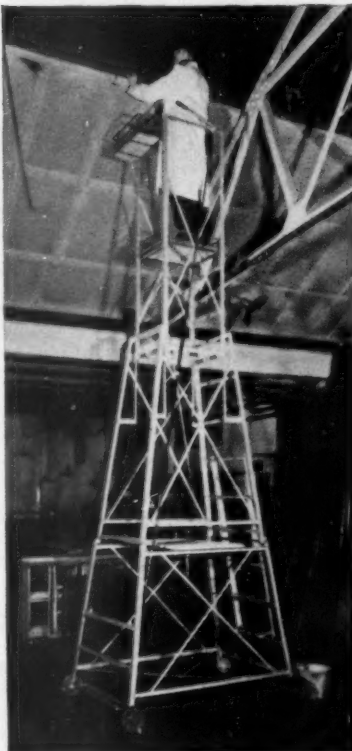
contained packaged unit which can be used virtually anywhere.

The booth is of monoform construction in 16 s.w.g. sheet metal and is 5 ft. wide, 4 ft. overall depth, and has a height of 9 ft. 2 in. to the fan.

Additional information can be obtained from Alfred Bullows & Sons Limited, Long Street, Walsall, Staffs.

SELF-PROPELLED STAGING

A new addition to a range of staging is illustrated. This self-propelled staging collapses into itself, affording economy of height when not in use. When closed the overall height is 5 ft. 11 in., fully



extended the height is 16 ft.

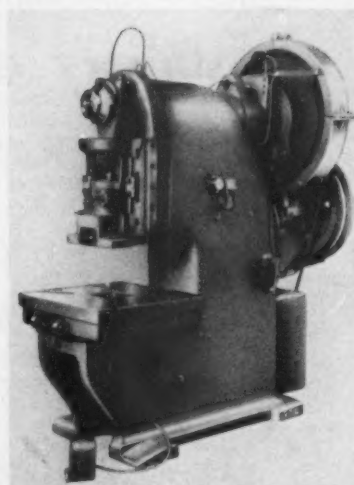
Gear drive to the wheels and steering are operated by handles on the platform rail, which enable the unit to be moved without the operator requiring to descend.

The unit has a capacity of 250 lb. and a net weight of 332 lb.

Further information is obtainable from Anderston Clyde (Midlands) Limited, Irk Vale Works, Chadderton, Lancashire.

HEAVY-DUTY PRESSES

Dansk Pressfabrik presses are now available in Britain. Currently more than 80 models are available. These are divisible into the following main types of geared and ungeared machines: open-fronted eccentric, inclinable open-fronted eccentric, narrow straight-sided, wide



straight-sided, double-acting, drawing, and friction-screw.

The open-fronted eccentric example illustrated is of 60 tons capacity and has an extra-deep throat of 17½ in. It has gearing on a hydraulic clutch. Other presses in this series range up to 200 tons.

Further particulars are obtainable from the importer, Soag Machine Tools Limited, Juxon Street, Lambeth, London, S.E.11.

HEAVY-DUTY CASTOR

This sprung castor has a flanged-headfitting housing retaining a double tapered-roller race in conjunction with a heavy ball race. The forks are of fabricated and welded steel. Needle wheel bearings are provided. Similar types of castors, with different pre-stressed loads and sizes of wheels and types of bearings, can be supplied.

Full particulars are obtainable from Autaset (Production) Limited, 70, Stour Street, Birmingham, 18.



Ministry of Transport Accident Report

Electrical fire between Redbridge and Gants Hill, Central Line, London Transport Railways, on August 11, 1960

Colonel D. McMullen, Inspecting Officer of Railways, Ministry of Transport, inquired into the electrical fire on an east-bound tube train in the tunnel between Redbridge and Gants Hill stations on the Central Line, London Transport Railways, at about 8.15 a.m. on August 11, 1960.

The line runs in tunnel from 350 yd. beyond Leytonstone to the west through Redbridge and Gants Hill to just short of Newbury Park to the east. The fire began at a point 240 yd. east of Redbridge.

Severe arcing began in the power receptacle box at the front end of the leading car and spread to the equipment chamber behind the driver's cab. Many cables were burnt away, and the arcing set fire to a panel between the chamber and the cab and to the paint on the roof. A very large amount of acrid fumes and smoke was produced, which quickly filled the tunnel and the train. The train was stopped by the driver, who, at about 8.19 a.m., cut off the current by operating the tunnel wires from a position near the centre of the train. The arcing then stopped.

Fortunately, there were only 50 passengers in the train. They were detained and conducted back along the track to Redbridge station. The driver and 39 of the passengers were taken or went to hospital, all of them suffering from the effects of the fumes and smoke.

As there are cross connections between the east-bound and west-bound tunnels, current was switched off the west-bound line to ensure the safety of the detained passengers if they strayed on it. As a result, a west-bound train became stalled in the tunnel on the approach to Leytonstone Station. Instructions were issued at 9.4 a.m. for its passengers to be detained and taken to Leytonstone.

The circumstances of the accident were very similar to one which occurred near Holland Park Station, also on the Central Line, on July 28, 1958. Colonel McMullen held an inquiry into that accident and presented a report which was summarised in our issue of April 3, 1959.

Composition of train

The train consisted of eight cars, made up of two four-car sets, each having a driving motor car at each end with two trailer cars in between. The arcing occurred at the front end of the leading motor car. Power is fed to a motor car either from the "live" rails through the collecting shoes or through a power receptacle box. Before the Holland Park fire all such cars had a receptacle box at each end, but as the result of that accident all the guard's end receptacle boxes were removed.

Receptacle boxes are used for moving the cars and for testing purposes in repair sheds, etc., where there are no live rails: A plug on a jumper cable from an overhead bus line is inserted into one of the boxes. This plug is inserted into two terminals located in a "binocular" insulator fixed in a cast-iron case secured to the car frame. White capping metal is used to fix the insulator to the back casing of the box.

Train crew's evidence

The motorman, who was considerably shocked, said that on leaving Redbridge he felt a "drag" on the train. He then saw a glare on the tunnel wall ahead. He shut off power and, as he did so, he heard "an explosion" under the train. He then saw a big arc under the train with flames shooting forward. He thought that the main light in his cab went out at the same time, and that the emergency light did not come on. In the dark he found his telephone handset, opened the offside door and attached it to the tunnel telephone wires. He tried to speak to the electrical control room operator but got no reply, so he then pinched the wires together (this automatically cuts off the traction current and turns on the tunnel lights). He said that the tunnel lights did not come on, and this surprised him. He then opened the main links and the "ten-point" switch in the cab to isolate the controls, and spoke to the guard on the train "intercom" telephone, telling him to meet him half-way along the train. He also tried to use the "Draco" telephone, which when clipped to the tunnel wires communicates with the traffic controller, but realised that in the dark he had probably undone the wrong thumb screw.

On passing with a passenger back through the equipment chamber passage, he found it no hotter than usual, but when passing through the passenger compartment he saw the reflection of the flames outside and heard the terrifying roar of the arcing. He was worried about whether the current was really off, as the tunnel lights had not come on. Nor were there any lights, either main or emergency, in the four-car set comprising the front half of the train. When he reached the second four-car set he saw that here the emergency lights had come on. At this point he met the guard. When he reached the rearmost driving cab, he spoke to the traffic controller—with some difficulty, as he was coughing—and got an assurance that the current had been cut off.

The guard said that, as he was walking forward, on reaching about the second car from the front, the main lights flickered and went out and the emergency lights came on. He then met the motorman, and saw that he was carrying a telephone. He could not remember if the motorman stopped to telephone from one of the centre motor cars, but he said that the motorman pinched the tunnel wires and used the "Draco" telephone from the rear car. The smoke and fumes were very thick, and at one time the motorman was coughing so much that he, the

guard, had to speak to the traffic controller.

The Redbridge Station foreman and other station staff described the action they took from about 8.17 a.m., when the foreman first saw smoke seeping out of the tunnels. At 8.21 a.m., after running to the tunnel mouth, he telephoned the traffic controller, reporting what he had seen, and saying that he was calling the fire brigade. At 8.24 a.m., the traffic controller called him to ask if the current had been switched off at the switch by the tunnel head-wall telephone. He said that it had not, and the controller then told him that there was a train between Redbridge and Gants Hill, that the current was off, and that he should arrange to detain the passengers and walk them back to Redbridge. The time was then about 8.37 a.m. All the passengers arrived at Redbridge Station by 8.51 a.m. Meanwhile the fire brigade had been called at about 8.22 a.m., but no reference was made to the need for breathing apparatus, nor were ambulances then asked for, as it was not known at that time that they would be required. Ambulances were actually called for at 8.45 a.m. The fire brigade arrived at 8.30 and 8.32 a.m.

The fire brigade officers described how the fire was extinguished. One said that, when he first entered the tunnel, the smoke was "fairly thick . . . for people who had been sitting in that train it was just about as much as they could manage."

The motorman of the west-bound train said that there was smoke in his tunnel from east of Redbridge onward. He was stopped at a signal 80 yd. inside the tunnel at the Leytonstone end, and at 8.37 a.m. the current went off. At 8.45 a.m., the Leytonstone stationmaster told the traffic controller that the current was off. He telephoned the controller again at 8.58 a.m., and at 9.3 a.m. he was instructed to detain the passengers. After having the current discharged from part of the track at the station, he began the detainment at 9.14 a.m., and it was completed at 9.51 a.m.

Traffic control

The traffic controllers who dealt with the situation gave evidence as to the sequence of events (some of the times given above are taken from their evidence). They had not been informed that at 8.19 a.m. the Redbridge sub-station circuit-breaker had opened on overload, nor did they cross-question the Redbridge Station foreman on his first report. It was not until 8.30 a.m. that they knew that a train was involved, and it was only 8.34 a.m. when they found out where it was. As regards the west-bound train, when hearing that it had stalled, they had considered telling someone at Redbridge to open the west-bound current-rail section switch to enable the track to Leytonstone to be re-energised, but they thought that everyone at Redbridge would already be too busy. Consequently, they decided that passengers from this west-bound train should be detained.

The operator at the South Woodford electrical control room described the sequence

of events from his point of view. He said that three times the tunnel telephone wires were operated, but each time he heard nothing. On instructions from the traffic controller, he discharged the current from the east-bound rail from Redbridge to Newbury Park at 8.30 a.m., and from the west-bound rail from Newbury Park to Leytonstone at 8.37 a.m. He did not inform the traffic controller about the overload opening of the Redbridge circuit-breaker at 8.19 a.m.

Ruislip depot evidence

The accident occurred on the morning of August 11. On the night of August 9/10 a shunter at Ruislip depot had to "rail" this train forward. When he reached it, he saw that the plug on the jumper cable had already been inserted in the receptacle box concerned. He tapped it with his shunting pole to make sure that it was properly inserted and then gave the train's driver the signal to start. As the train moved forward, fierce arcing started in the receptacle box. On the train being stopped the arcing ceased, and the shunter then took the plug out and left it on the floor, but its insulation went on burning. He said that the shed circuit-breakers must have opened, because the lights went out. He reported the matter to the chargehand.

The chargehand said that, on examining the receptacle box, he found that the two terminals were badly burnt, but that there was no carbon deposit on the inside of the insulator. He told two car examiners to change the terminals. He then saw arcing in the jumper cable-plug. This was stopped when the depot foreman opened the shed circuit-breakers.

The chargehand said that, after the new terminals had been fitted, he "meggered" the box and got readings of nearly infinity between the positive terminal and earth and the negative terminal and earth. He did not measure the resistance between the positive and negative terminals. He said that he had no instructions to make a proper resistance test between the bus lines on a train. The foreman was near him at the time, and the question of stopping the car for the receptacle box to be changed was never raised. Arcing in a box with damage to its terminals had occurred before, and in these previous cases exactly the same action had been taken as he took in this case.

The depot foreman said that, after cutting off the current from the burning jumper cable, he was told about the arcing in the receptacle box, but as he had to take some action to restore the depot to normal, he proceeded to deal with the jumper lead and then had electrical power restored. He said that the chargehand told him that the terminal pins in the receptacle box had been renewed, and that the insulation readings were good. He saw another jumper placed in the box and the train successfully "railed." He did not inspect the box, but saw that its original terminal pins, which had been removed from it, had each been burnt away for a distance of $\frac{3}{8}$ in. throughout their diameter. He agreed that this showed that the arcing had been heavy. He said that he would have expected the chargehand to test the insulation between the positive and negative and earth, but not between the terminals themselves. There were no instructions for this last test to be made.

The question of "stopping" a car off which a receptacle box had been damaged was left to his judgment. Having been told that the megger readings were good, he did not think such action justified in this case. Had he stopped this car, it would probably have meant the cancellation of a train. After the Holland Park fire, he had been told to be very careful about receptacle boxes, and if any arcing occurred to megger the positive and negative bus lines to earth, but, because of illness, he had not seen the film of the heavy arcing tests which had been made after that incident.

The foreman concluded by saying that he had entered the jumper cable-arc incident in the depot log book, but did not mention the arcing in the receptacle box, though he realised he should have done so. He had instructions to inform the depot engineer immediately of any incident that might affect the train service, but did not think that this particular incident justified such action.

The Ruislip depot engineer said that he had not read the foreman's log book on August 10, and knew nothing about the arcing on the night of August 9/10 until after the accident on August 11. He would have expected the foreman to inform him at once, telephoning him at home irrespective of the time. He also considered that the car should have been stopped for the receptacle box to be changed. He was aware that the report on the Holland Park accident pointed out that, although the resistance between the conductors and earth had been tested, the resistance between the conductors themselves had not been measured. He said that both the depot foreman and the chargehand should have known that both these tests had to be made, and that the foreman should have made them himself.

Instructions issued

Other members of London Transport's supervisory staff gave evidence as to the instructions which had been issued after the Holland Park accident. The line engineer for the Central Line said that when he came there in October, 1959, he assumed that these instructions relating to receptacle boxes had been issued, but he had not ascertained whether this had been done. He had given such instructions when he was on the Northern Line before that date. He said that he had seen the fused overhead trolley leads at Ruislip, and that he would definitely have expected the depot foreman either to have telephoned the depot engineer or made a special report about it.

Colonel McMullen described the large number of demonstrations and tests made for him since the accident. One such demonstration simulated the course of the arcing in the train involved in the accident, and the results were most successful (a similar demonstration was made after the Holland Park accident).

In the demonstration now described the arcing was begun by cutting away the bridge of the binocular insulator in the receptacle box and short-circuiting the terminal points with a welding rod. Within 16 sec. the arc had appeared through the front of the receptacle box and, by the end of 1 min. 32 sec., it had burnt through the back of the box. Arcing in the equipment chamber from the positive cable to earth had begun at the end of 3 min. 7 sec., and from the negative cable to earth at the end of 3 min. 18 sec. The

current was cut off and the arcing terminated after 3 min. 46 sec.

The current rose from 240 A to 320 A during the first $1\frac{1}{2}$ min., then to 2080 A within 10 secs. of the shunting resistance being cut out, after which it remained fairly constant till the end of the test when a maximum of 2440 A was recorded.

The temperature in the driving cab remained normal for $2\frac{1}{2}$ min. and then rose to 335 deg.C. in the next $1\frac{1}{2}$ min. In the equipment chamber it remained normal for 3 mins. and then rose to 345 deg.C. in $1\frac{1}{2}$ mins.

When the arcing stopped it stood at about 200 deg.C. The extent of the arcing and the damage caused by it were similar to that in the train at Redbridge, but the burning subsequent to the arcing was greater. The arcing was extremely fierce, its spread was rapid, and it was accompanied by the typical roar. It burst through the back of the receptacle box with noise not unlike that of an explosion.

Further arcing tests were made on receptacle boxes in a 1938-type motor car. In this type, the box is located about half-way along the side of the car. The cables are only about 15 in. long. They lead to a panel carrying the fuses in the circuits of the auxiliary equipment, are not in conduit, and therefore form what was described in the Holland Park report as a "fire-break."

In the two receptacle boxes used in this test neoprene cables had been fitted and led through the back casing of the box in long stout rubber bushes. A non-conducting resin-based substance called "Hermal" had been used instead of the white metal for sealing the binocular to the casing. A vulcanised fibre board had been fixed to the base of the back casing of the box to form a physical and electrical shield between the positive and negative cables. The boxes had been completely insulated from the frame of the car.

In these two tests the arcing continued in one case for 1 min. 23 sec., and in the other case for 50 sec., before it stopped. In both cases a very considerable quantity of smoke was produced.

Inspecting officer's conclusions

Colonel McMullen stated his conclusions under 12 heads.

i. The electrical fire was caused by severe arcing in a power receptacle box in a motor car. He had no doubt that this had resulted from damage to the box caused when the severe arcing took place at Ruislip Depot on the morning before the accident. This must have been caused by the insecure placing of the jumper plug in the box by an unidentified member of the staff. The heat generated by the arcing must have been sufficient to melt the white capping metal and/or the solder used for securing the cables to the terminal ferrules, causing one or both of them to "run." This in turn considerably reduced the resistance of the insulation, finally causing it to break down either when moisture entered the box (it was a wet day) or through a voltage surge, or probably through a combination of both. It probably began as a positive earth resulting in a low current arc at the back of the box, which broke down the negative insulation and caused a high current arc between the poles.

ii. The main responsibility for the accident rested on the depot foreman at Ruislip. He

did not inspect the box after the arcing on August 9/10, he did not witness the testing of it after the new pins had been fitted, neither did he ask what tests had been applied. Although he had been told to be careful about receptacle boxes, he maintained that he had not received instructions to make a test of the insulation between the positive and negative conductors. He did not consider stopping the car for the receptacle box to be changed. This last, Colonel McMullen stated, was a serious error of judgment. If he had been in any doubt, he should have sought advice from the depot engineer. But Colonel McMullen did not think that he was in any doubt. On the contrary, he gave very little thought to the arcing in the receptacle box, and was far more concerned with the arcing and fire in the jumper cable which could have delayed getting trains out of the depot. He did not even make a special report about the incident for the information of the depot engineer. Colonel McMullen added that he did not think that sufficient steps had been taken to impress on the staff the utmost importance of paying special attention to receptacle boxes and of stopping a car if one was damaged.

Experience not applied

iii. This accident should not have occurred. If the lessons from the previous similar accident at Holland Park had been properly learned and applied by some of the staff concerned, the car would not have been allowed to go into service without the receptacle box having been changed. There was no doubt that, since the Holland Park accident, trains had been allowed to go into service from Ruislip after arcing had occurred in the receptacle box without the box being changed or properly tested. An accident of this nature was therefore liable to happen sooner or later. The depot foreman did not know that the resistance of the insulation between the terminal pins should be measured, in spite of the fact that particular attention had been drawn to this in the Holland Park report. Colonel McMullen was glad to report that, since the accident, detailed instructions had been issued that, in the event of any damage to or arcing taking place in a receptacle box, the car was to be stopped even if it meant the cancellation of a train.

Under heads iv to vii, Colonel McMullen discussed the action already taken or to be taken as the result of the Holland Park and Redbridge accidents. Protective material had been provided to prevent an arc from penetrating into a passenger compartment or the driving cab. One of the two end receptacle boxes had already been removed from each pre-1938 motor car, and arrangements were in force for the periodical overhaul, including the replacement of the binocular insulator, of all remaining receptacle boxes.

Colonel McMullen quoted a passage from his Holland Park report regarding the 540 pre-1938 cars then in service but scheduled for scrapping by 1963. He added that, since the Redbridge accident, a means had been devised of removing the positive conductor from the receptacle boxes by providing a terminal plug on the positive shoe beam and by separating the positive and negative jumper plugs. This alteration was carried out rapidly, and there was now

no chance of such fierce arcing between the positive and negative conductors on this old stock, as the result of a defective receptacle box.

Other alterations were to be made to receptacle boxes, not only in this old tube stock, but also in 1938 and later tube stock and in all Metropolitan and District line stock. All tube stock built in 1938 and later was provided with a fire-break, and so was half the Metropolitan and District stock likely to remain in service for some time. This last work was expected to be complete by the end of 1963.

Ways of snuffing out any arc in a receptacle box were now under test. If successful, they would reduce the amount of smoke caused by arcing. In Colonel McMullen's view, every practicable precaution had been or was being taken to prevent a recurrence of serious arcing resulting from a defect in a receptacle box.

Nevertheless, there had been two recent cases of arcing at other places in cars. These indicated that an extremely high standard of maintenance and inspection of the equipment was of vital importance. Again, the initial cause of the Redbridge accident was that the jumper plug had not been secured properly in the box. Colonel McMullen was glad to report that steps had been taken to stop such slack working.

Under heads viii to x, Colonel McMullen stated that the motorman and guard of the eastbound train had done everything that could be expected of them in very difficult circumstances. But drivers should be instructed that, when it was urgently necessary for the current to be removed, they should immediately pinch the tunnel wires together. Having done so, they should attach their telephone hand-set to the wires.

Staff commended

The staff at Redbridge Station had acted well in the emergency. But the detainment of the passengers from the west-bound train should have been unnecessary. In deciding not to instruct some member of the Redbridge station staff to open the rail current section switch on the west-bound rail, the traffic controllers committed an error of judgment. This switch was provided for the express purpose of dealing with situations such as this. Had it been opened, the section from Redbridge to Leytonstone could have been re-energised, and the train probably brought into Leytonstone under power.

Under heads xi and xii Colonel McMullen states that, while the Fire Brigade and other services were called promptly, a few minutes might have been saved if, on learning that smoke was emerging from a tunnel and that the tunnel telephone wires had been operated, the traffic controllers had at once assumed that a train was in trouble and possibly on fire. The electrical control room operator should also have told the traffic controllers that the circuit-breakers had tripped on overload. The traffic controllers should have obtained more detailed information more quickly from the Redbridge staff by asking questions.

The provision of speech-recording apparatus in the traffic control offices was also being investigated. Colonel McMullen pointed out its value in the assessment of the handling of all emergency situations, and recommended that serious consideration be given to its provision.

Faster West Riding to London services

The North Eastern Region of British Railways will provide faster weekday services between the West Riding and London in the autumn of this year.

Beginning on September 11, nearly all services will be faster and the journey time saved will vary between 9 and 55 min. "The West Riding," which will leave Bradford Exchange at 7.05 a.m., Leeds Central at 7.30 a.m., Wakefield Westgate at 7.46 a.m. and then run non-stop to Kings Cross where it will arrive at 10.30 a.m., will give a 3-hr. service between Leeds and London, and save 45 min. on present timings.

A train at 5 p.m. from Bradford Exchange, 5.29 p.m. from Leeds (Central) and 5.45 p.m. from Wakefield Westgate will arrive at Kings Cross at 8.42 p.m., a saving of 55 min.

The 6.06 p.m. (Fridays only) train from Bradford Exchange will be re-timed to leave Bradford Exchange at 5.50 p.m., Leeds Central at 6.15 p.m., Wakefield Westgate at 6.36 p.m., Doncaster at 7.07 p.m., and will arrive at Kings Cross at 9.50 p.m.

From London, "The West Riding" (7.45 a.m. from Kings Cross) will arrive at Leeds Central at 10.54 a.m. and Bradford Exchange at 11.24 a.m., a saving of 44 min. and 32 min. respectively. This train will stop at Hitchin and Retford, but not at Doncaster and Wakefield.

Yorkshire Pullman

"The Yorkshire Pullman" will be re-timed to leave Kings Cross at 5.25 p.m. and will arrive at Doncaster (7.50 p.m.), Wakefield Westgate (8.18 p.m.), Leeds Central (8.40 p.m.), Bradford Exchange (9.06 p.m.), and Harrogate at 9.20 p.m. The journey time has been reduced by 47 min.

From Halifax and Huddersfield a new service will be given by a train leaving Halifax at 7.15 a.m., and Huddersfield at 7.41 a.m., which will join up at Wakefield Kirkgate with the train leaving Leeds Central at 7.42 a.m. A new through service to Halifax and Huddersfield will be given on the 1.18 p.m. from Kings Cross.

The 7.18 a.m. Bradford to Kings Cross will be withdrawn as will the through portion to Bradford on the 1.18 p.m. from Kings Cross.

Reduction in journey time on other trains on this service will vary between 10 and 23 min.

The following trains to Kings Cross are included in this group:

10 a.m., 12.30 p.m. and 3.32 p.m. from Leeds Central

10.07 a.m. from Harrogate

5.50 p.m. Mondays to Thursdays from Bradford (Exchange).

The following services from Kings Cross to the West Riding will also be faster:

9.20 a.m., "The White Rose;" 11.50 a.m., "The Queen of Scots Pullman."

10.20 a.m., 4.05 p.m., 6.12 p.m. and 6.05 p.m. (Fridays only).

INCREASED PARKING FEE

The Western Region of British Railways has raised the parking fee for holiday makers at Looe and other seaside resorts in Cornwall to 5s. The charge last year was 2s.

Special Consignment to Italy

On June 2, the North Eastern Region of British Railways loaded at Stillington, near Stockton, a unique consignment for Italy in the form of 11 large covered containers, each containing about a ton of stainless steel "reflective insulation." The consignment is destined for a nuclear power station designed by the Nuclear Power Group of Knutsford, Cheshire, and being built at Litina in Italy. It is to be used in the reactor pressure vessel designed and manufactured by Whessoe Limited, of Darlington. The insulation has been manufactured by Darchem Engineering Limited of Stillington.

The containers, each measuring approximately 15 ft. long x 6 ft. wide x 6 ft. 6 in. high (capacity 600 cu. ft. each), were loaded by forklift truck on 11 special container wagons at Stillington Goods Station. The wagons were conveyed in a block load by express freight train to Newhaven, across to Dieppe by cross-channel boat, re-loaded on French flat wagons for travel via Chiasso to Litina. So that the insulation remained completely free from contamination, the routing ensured that the contents of the containers remains untouched, except for Customs examination, from the time they were loaded to unloading in Italy. This is the first consignment of the special type of "reflective insulation" to be sent abroad. The insulation consists in layers of thin-gauge stainless-steel foil which protects the steel pressure vessel from the heat generated in the reactor core.

Diesel service for Cheshire

On June 12, the local steam services between Birkenhead-Helsby, Birkenhead-Chester, and Chester-Lime Street on the London Midland Region of British Railways were largely replaced by modern diesel railcars. The only exceptions are through expresses to and from destinations beyond Chester and one heavily loaded peak hour train in each direction between Birkenhead and Chester. These remain locomotive hauled—at present by steam engine, ultimately by diesel-electric locomotive. The scheme, which provides more trains and faster timings, involves the use of 16 two-car diesel units costing over £½ million.

Faster timings

An average of 8 min. has been clipped off the Birkenhead-Chester times, and 10 minutes off the Birkenhead-Helsby times. So far as possible, the service now gives a regular interval pattern. Trains between Chester and Birkenhead will leave hourly, at 8 min. past the hour from Chester, calling at Upton-by-Chester, Hooton, and Rock Ferry, and at 25 min. past the hour from Birkenhead, calling at the same stations. Some trains will call additionally at Capenhurst. Together with the steam expresses, the diesel service provides two services each hour between Birkenhead and Chester for most of the day.

The service between Birkenhead and Helsby is also hourly, stopping at all stations and connecting with the Birkenhead-Chester trains at Hooton. The trains leave Helsby at 8 min. past the hour, and Birkenhead at 15 min. past the hour.

Local trains between Chester and Lime Street have also been replaced by diesel railcars, which cover the journey in 12 or more minutes less time than the steam trains. Six additional trains run over this route on Sundays. All the railcars for these services will be maintained at the newly converted Chester West diesel depot, which will be in full operation shortly.

The railcar units were built by British Railways at Derby, and consist of a motor-coach powered by two 150 h.p. Leyland diesel engines, and a trailer coach. The units can be driven from either end, and up to four can be coupled together to meet variations in the loadings. Each two-car unit seats 105 second and 12 first class passengers.

The illustration on this page shows Mr. H. A. Mugliston, Divisional Traffic Manager, Merseyside & North Wales Division, British Railways, London Midland Region, welcoming the Mayor of Birkenhead, Mrs. D. Melville, and the President of Birkenhead Chamber of Commerce, Viscount Leverhulme, to the preview trip on one of the diesel multiple units.

Staff & Labour Matters

Shorter working week

At a meeting of the Railway Staff National Council in London on June 7, representatives of the British Transport Commission and the three railway trade unions discussed the Commission's offer to set up a joint working party to examine the problems involved in introducing a shorter working week for British Railways salaried and conciliation staff.

The parties discussed the position arising from acceptance of the Commission's offer by the N.U.R. and A.S.L.E. & F., and the T.S.S.A.'s decision not to accept the offer but to pursue their claim for a 5-day 38-hr. week for salaried staff to the Railway Staff National Tribunal. The representatives of the A.S.L.E. & F. indicated that they would

still be prepared to take part in discussions through the medium of a joint working party and the N.U.R. representatives stated that they would report the position to their Executive Committee and advise the result.

At a further meeting of the Railway Staff National Council on June 7, at which the Commission's offer to reduce the standard working week of railway salaried and conciliation staff was discussed, the T.S.S.A. reiterated their view that a standard 38-hour week to be worked in five days should be introduced for all salaried staff.

As no agreement was reached on the claim the T.S.S.A. have referred the matter to the Railway Staff National Tribunal for decision.

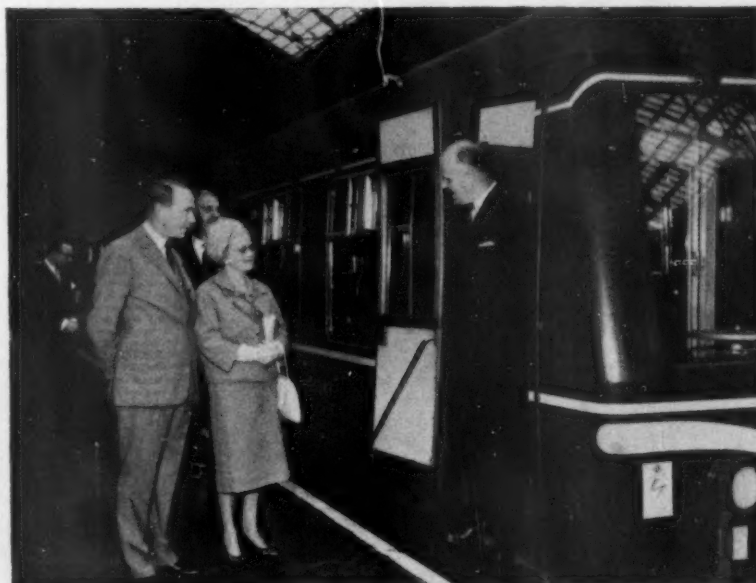
The A.S.L.E. & F. and N.U.R. had already signified their willingness to participate in the establishment of a joint working party to examine ways and means of implementing a shorter working week of 42 hours for wages grades and 40 hours for salaried staff, but the N.U.R., whose membership includes many salaried grades, arranged to consider their position. The union's executive committee has now decided to go ahead on the basis of a 42-hour week for conciliation grades, as offered by the Commission, and to examine its implementation at joint working-party level.

Strike of British Railways motor drivers

On Monday last, June 12, sporadic strikes of an unofficial character at goods and parcels depots on British Railways were staged by motor drivers in support of their claim for one rate of pay (198s. a week) irrespective of the capacity of the vehicle concerned.

These unofficial stoppages of work took place despite an appeal to the branches from the headquarters of the N.U.R. for the men to work normally, having regard to the fact that the claim is under consideration nationally through the medium of the normal negotiating machinery.

A meeting of the Railway Staff Joint Council had already been fixed for June 14 to discuss the claim.



Mr. H. A. Mugliston welcoming the Mayor of Birkenhead and Lord Leverhulme

North British centralisation

Concentration of the work of the North British Locomotive Co. Ltd. at Queen's Park will be completed this year, according to Mr. T. Coughtrie, Chairman of the company, in his annual statement with the accounts.

Capacity of the plant should be sufficient to produce in one works instead of three an output equal to that despatched in 1960. Lease or sale of the administration building was under negotiation.

The plant for production of hydraulic transmission units and torque converters had been extended and several new projects were under review. Much of the output of the Carnyne Steel Castings Co. Ltd. was being machined by North British to mutual advantage.

CONTRACTS & TENDERS

BOARD OF TRADE

The Export Services Branch, Board of Trade, has received calls for tenders as follow:—

From Thailand:

- 40 diesel locomotives with electric transmission
- 20 diesel locomotives with hydraulic transmission.

The issuing authority is the Stores Superintendent, State Railways of Thailand, Yodse, Bangkok, to whom bids should be sent. The closing date is August 14, 1961. The issuing authority is ESB/14197/61.

Design, construction, supply and delivery of five units of diesel shunting locomotives, and spare parts. The diesel locomotive shall be of hood type single driving cab construction to be equipped with either hydraulic or hydro-mechanical power transmission system, shall be designed and constructed suitable for shunting working only on one metre gauge track of the R.S.R. system, shall be capable to haul maximum trailing load of 1,200 tonnes when shunting on level in yards at the shunting speed of 10 km. per hr.

The issuing authority is the Stores Superintendent, State Railways of Thailand, Bangkok, to whom bids should be sent. The closing date is September 11, 1961. The Board of Trade reference is ESB/17041/61.

From Sudan:

- 2 electric motor-driven two-stage centrifugal pumps capable of delivering 35,000 imp. gal. of water per hr. against the delivery head.

The issuing authority is the Controller of Stores, Sudan Railways, Stores Department, Atbara, to whom bids should be sent. The tender No. is 2380. The closing date is July 5, 1961. The Board of Trade reference is ESB/15437/61.

A two-span trussed shed of length

300 ft. x 120 ft. centre to centre of joists. Height from floor level to eaves is 27 ft. The height from floor level to top of crane rail is 19 ft. To be in accordance with B.S.S. No. 449 (1959) and our drawing No. CB589, alternative design can be considered if detailed drawing is submitted. Pitched steel trusses at 12 ft. 6 in. spacing with skylights are required as shown on the drawing. Angle purlins to suit roof sheeting. Suitable angle wind bracings should be supplied as shown on the drawing. Galvanised corrugated iron sheeting No. 24 for roof and sides and ridge capping for skylights.

The issuing authority is the Office of Controller of Stores, Sudan Railways, Stores Department, Atbara, to whom bids should be sent. The tender No. is 2379. Specifications and conditions only are available at the Board of Trade. Drawings may be available later. The closing date is July 3, 1961. The Board of Trade reference is ESB/15442/61.

1 30 tons hydraulic pit jack to the following particulars: max. load to be lifted: 30 tons; stroke: 4 ft. 6 in.; min. height of jack above top of jack rail to seat of swivelling yoke head: 3 ft.; cast steel swivelling yoke head suitable for axle up to 9 in. dia.; cross travel of jack on either side of the centre line: 6 in.; and gauge of jack track: 2 ft. 6 in.

The issuing authority is the Office of Controller of Stores, Stores Department, Sudan Railways, Atbara, to which bids should be sent. The tender No. is 2383. The closing date is July 6, 1961. The Board of Trade reference is ESB/16870/61.

1 pneumatic power hammer arranged electric motor driven through "V" ropes capacity 10 cwt.

The issuing authority is the Office of Controller of Stores, Stores Department, Sudan Railways, Atbara, to which bids should be sent. The tender No. is 2384. The closing date is July 10, 1961. The Board of Trade reference is ESB/16869/61.

30 tonnes soft soap, brown.

The issuing authority is the Office of the Controller of Stores, Sudan Railways,

Atbara, to whom bids should be sent. The tender No. is 2392. The closing date is July 4, 1961. The Board of Trade reference is ESB/17853/61.

Further details relating to the above tenders together with photo-copies of tender documents, unless otherwise stated, can be obtained from the Branch (Lacon House, Theobald's Road, W.C.1).

NOTES AND NEWS

Buffet cars withdrawn. The Scottish Region of British Railways have withdrawn buffet facilities from the following trains because of lack of patronage: Glasgow to Stranraer service, 5.10 p.m. SX; 5.15 p.m. SO; 8.45 p.m. SO; 9 p.m. SX. Stranraer to Glasgow; 4.40 p.m. daily, and 9.15 p.m. daily.

British Railways parcel van. Nearly 200 2-ton parcel vans are being introduced on the Eastern Region of British Railways. The bodies for the vehicles are being built in the Road Van Shops of the Chief Mechanical & Electrical Engineer at Temple Mills. One of the vehicles is illustrated below.

Car sleeper service to Scotland. From May 16, the overnight car sleeper trains between Marylebone and Glasgow were resumed. Trains leave Marylebone at 7.10 p.m. on Tuesdays, Thursdays, and Saturdays, returning from Glasgow at 6.38 p.m. on Mondays, Wednesdays, and Saturdays.

B.S. iron castings. Three grades have been included in the revised British Standard for iron castings, with spheroidal or nodular graphite, as a result of experience gained in the last few years. The types of iron now covered are those with ferritic, mainly ferritic, ferritic-pearlitic, and mainly pearlitic



One of the 2-ton parcel vans for the Eastern Region of British Railways



The Queensland Minister of Transport at Associated Electrical Industries Limited, Manchester

matrices. The number of the specification is BS 2789: 1961, and the price 5s. It is obtainable from the British Standards Institution, 2 Park Street, London, W.1.

A.E.I. price changes. Adjustments to the prices of most Mazda general lighting service and allied filament lamps have been announced by A.E.I. Lamp & Lighting Co. Ltd. The main types of lamps affected are:—domestic, decorative, tubular, infra-red and reflector lamps.

International Combustion group. The boards of International Combustion (Holdings) Limited and the Superheater Co. Ltd. have announced that they have reached agreement with a view to the Superheater Co. Ltd. joining the International Combustion group. The merger will be effected by an offer on behalf of International Combustion (Holdings) Limited to acquire the issued share capital of the Superheater Co. Ltd. on the basis of seven 5s. Ordinary shares of International Combustion for every ten 5s. Ordinary or "A" Ordinary shares of Superheater.

Girl fire-fighters. Girl fire-fighters from the Southern and North Eastern Regions of British Railways went into action for the first time in the Southern Region of British Railways at the London Fire Brigade headquarters at Lambeth on June 7. They were competing in the British Railways Inter-regional Fire Fighting Finals. Shields and prizes were presented by the General Manager of the Southern Region, Mr. C. P. Hopkins.

Queensland Minister of Transport. The Queensland Minister of Transport, the Hon. G. W. W. Chalk, visited the Trafford Park Works, Manchester, of the Associated Electrical Industries Limited, on May 24. In the illustration above are, from left to right. Mr. F. Whyman, Divisional Director & General Manager of the A.E.I. Traction Division, Mr. C. R. Hardham, A.E.I. Export Company, Mr. R. H. S. Turner,

Director & Works Manager, A.E.I. (Manchester) Limited, and Mr. Chalk. The rotor on the right is for Venezuela and the half-cooler enclosure in the background is for Australia.

Overseas visitors. During March, 97,980 visitors from overseas came to Britain, an increase of 39 per cent compared with the same month last year. The March figures brought the total number, during the first three months of the year to 218,900—an increase of 24 per cent compared with arrivals in the same period in 1960.

Southend electric stock. The illustration below shows the first electric train leaving Shoburyness for Southend (Central), during trial running on the London Tilbury & Southend line inaugurated on June 1. The multiple unit trains for this electrification comprise 112 four-coach units, comprising driving trailer, motor coach, non-driving trailer and driving trailer. They are arranged

for multiple-unit working in up to three units. Each unit has seating accommodation for 363 seated passengers, and weighs 175 tons 12 cwt.

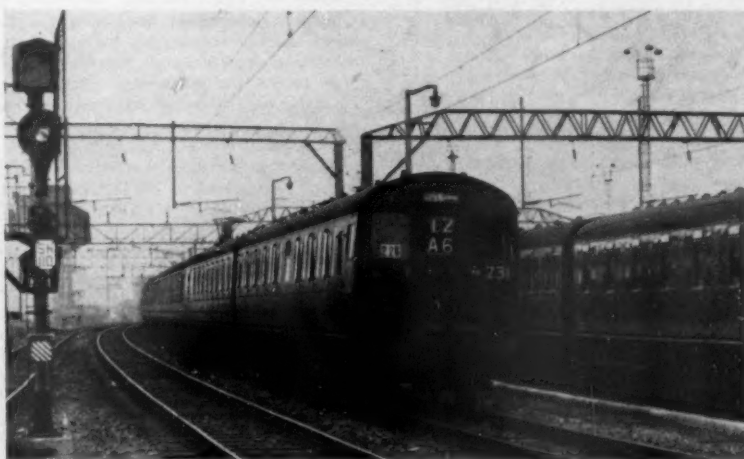
Ramblers' excursion. The North Eastern Region of British Railways is to run a ramblers' excursion, in collaboration with the Ramblers' Association, from Sunderland and Newcastle to Barnard Castle, Cotherstone, Mickleton, and Middleton-in-Teesdale, on June 18. Guided rambles from certain stations have been arranged.

Railway Enthusiast's Club tour. The Railway Enthusiast's Club is to run a tour by diesel train in the North Lincolnshire area on July 23, starting from Doncaster at 10.50 a.m. The fare for the tour will be 34s., and tickets may be obtained from Mr. A. P. Miall, "Hurstbourne," Wansford Road, Everton, Lymington, Hants., by enclosing a stamped and addressed envelope.

Marylebone diesel service augmented. From June 12, the London Midland Region of British Railways has increased the number of diesel multiple-unit trains on the High Wycombe and Aylesbury lines from Marylebone. First class facilities have been re-introduced on the new trains which will be comprised of four-car sets with 302 second, and 30 first-class seats.

Russian adjustable axle. A Russian goods train crossed into East Germany recently without having to change axles at the Polish-Russian border. It was equipped with an axle which adjusted itself automatically to the difference in gauge. The train took only 12 days instead of 24 for the 3,900-mile trip. It is reported that Russia intends to use the new axles for international passenger trains.

Diesel trains in Southern Region. Certain Southern Region services between Reading, Basingstoke, Winchester, Southampton and Portsmouth are now being operated with three-car diesel-mechanical trains. The trains, which are Western Region units based on Reading, were built by the Railway Division of the Pressed Steel Co. Ltd., and are each powered by four 680 series British United Traction under-floor diesels. The complete traction and control equipment was supplied



Train undergoing trial running on the Southend line of the Eastern Region

by B.U.T. All sets include a driving motor second, trailer composite, and driving motor brake second, and can be operated as six- or nine-car trains.

Industrial Finishes Exhibition. Over 15,000 people attended this exhibition held in London, May 8-11. The success of this has led to preparations being made for a second exhibition at Earls Court, London, May 20-24, 1963.

Aberdeen-Inverness augmented service. On June 12, the Scottish Region of British Railways commenced to run four diesel express trains in each direction between Aberdeen and Inverness. The trains connect with main-line trains to the south from Aberdeen and with the trains to the north from Inverness. There are 18 first class and 144 second class seats, and light refreshments are served from a miniature buffet.

Elimination of steam services. The Scottish Region of British Railways has eliminated steam engines on all trains north of Inverness. Faster diesel-operated services came into effect with the introduction of the summer service on June 12 and an extra train will run in each direction between Inverness and Wick, covering the journey in 4 hr. 20 min.

Special trains convey girders. The North Eastern Region of British Railways ran three special trains from the Exchange Sidings of the Tees-side Bridge & Engineering Works Limited, Middlesbrough, to Stapleford & Sandiacre Station in Nottinghamshire, on June 12, to convey 30 out-of-gauge girders, measuring up to 99 ft. x 6 ft. 6 in. x 3 ft. 3 in., the largest weighing 17½ tons. These girders were for use in the construction of the road bridge which will carry Trunk Road A.52 (Sandiacre-Stapleford by-pass) over railway sidings at Toton Marshalling Yard in the London Midland Region.

Rail and bus ticket interavailability. The London Midland Region of British Railways, Cumberland Motor Services Limited, and Ribble Motor Services Limited have agreed to the return half of their respective tickets being available by either bus or rail, without extra charge, on the Workington-Keswick-Penrith route. The arrangement applies to special cheap day return tickets by rail which will be available to return by bus on the day of issue, and to ordinary return tickets by bus which may be used for the return journey by train within three months of the day of issue.

Stations to close. Moss Side and Wrea Green stations, between Kirkham and Lytham on the London Midland Region of British Railways, will be closed on June 26. Moss Side will be closed to all traffic and Wrea Green closed for passenger and parcels traffic, and made an unstaffed goods and coal depot. Passengers will book to Kirkham & Wesham or Lytham according to direction of travel. The locality is served by buses of Ribble Motor Services Limited. Parcels and passenger train merchandise will be dealt with at Kirkham & Wesham. Freight traffic is not dealt with at Moss Side. At Wrea Green full loads of S to S traffic and coal traffic, will continue to be dealt with, freight traffic, will

be handled at Preston or Kirkham & Wesham.

The Transport Tribunal. The annual report of the Transport Tribunal, covering its proceedings during 1960, has been presented to the Minister of Transport.

Formica at Moscow. Among the exhibits at the recently held British Trade Fair in Moscow was one illustrating Formica products. This showed many of its practical uses and some industrial applications.

BRS parcels depot extended. A parcels bank 180 ft. long and 50 ft. wide has been opened at the British Road Services parcels depot at Gypsy Lane, Willenhall, Staffs. The depot is responsible for the collection and delivery of general parcels traffic in the Black Country and an area extending to Stafford, Rugeley, Tamworth, Newport, Wellington, Shrewsbury, Bridgnorth and Brierley Hill. This building doubles the platform space previously available at Willenhall, and will handle outgoing traffic.

Railway Stock Market

Uncertain conditions have ruled in stock markets, because of the difficulty of assessing the near-term outlook. There has been no pronounced selling, and lower prices have attracted some selective buying.

There was not much business to test foreign rails. Antofagasta ordinary stock strengthened fractionally to 15½, though the preference stock remained at 31½. Costa Rica ordinary stock lost a point at 42½. Brazil Railway bonds were firmer at 4, Chilean Northern 5 per cent debentures kept at 50, Guayaquil & Quito assented bonds at 54½, Paraguay Central prior debentures at 18, and Mexican Central "A" bearer debentures were steady at 59.

United of Havana second income stock was again 5½; activity persisted in the 3s. units of San Paulo Railway, which rose from 1s. 9½d. a week ago to 2s. International of Central America common shares eased from \$19½ to \$18½, but the preferred stock was \$102½ compared with \$100 a week ago.

Canadian Pacific at \$47 were only fractionally lower. The 4 per cent preference stock eased to 60½, which compared with 56 for the 4 per cent debentures; the level of the preference stock is due partly to technical market conditions in Canada, but even so, on investment merits, the debentures, which give an attractive yield of over 7 per cent, are undervalued in comparison.

Midland of Western Australia £1 units of second debentures have been active around the slightly higher level of 10s. helped by attention drawn to the big development potentialities of Western Australia.

Shares of locomotive building and engineering shares have been fairly steady with Birmingham Wagon a shade better at 29s. North British Locomotive 7s. 3d. compared with 7s. a week ago; Wagon Repairs 5s. shares held their recent rise to 21s. 9d. and Gloucester Wagon 10s. shares have been rather firmer at 9s. 10½d. Beyer Peacock 5s. shares kept at 8s. 7½d., Charles Roberts 5s. shares at 8s. and G. D. Peters at 18s. 9d.

Widely held and active shares came back with the surrounding market tendency.

Vickers, for instance, were 35s. 9d., a fall of 1s. 3d. on balance, sentiment having been affected by the chairman's reference to rising costs. Tube Investments rose from 71s. 3d. to 73s. 3d. and T. W. Ward from 81s. to 82s.; Babcock & Wilcox gained 7½d. at 32s. 3d., though Stone-Platt at 58s. 9d. compared with 59s. 6d. a week ago. Guest Keen lost 1s. 7½d. at 94s. Leyland Motors eased from 95s. 9d. to 95s., Pressed Steel 5s. shares kept at 26s. 3d., and Dowty Group 10s. shares at 37s.

In electricals, English Electric rallied from 34s. 6d. to 35s. 6d., but G.E.C. lost 1s. 3d. at 34s., and A.E.I. eased slightly to 41s. 3d.

Forthcoming Meetings

June 15-24 (Thu.-Sat.). International Construction Equipment Exhibition, Crystal Palace, London.

June 17 (Sat.). Stephenson Locomotive Society. R.C.T.S. North Derbyshire rail tour of goods lines in the Chesterfield area.

June 17 (Sat.). The Railway & Canal Historical Society, North Western Group, visit to Railway Museum, York.

June 18 (Sun.). Railway & Canal Historical Society, North Eastern Branch. Coach tour of Sheffield & Rotherham Railway, Greasborough Railway, Thorncliffe & Elsecar Railway, Worsborough Railway and Thurgoland branch.

June 22 (Thu.). The Permanent Way Institution, Nottingham & Derby Section. Evening coach tour of Charnwood Forest, and social evening.

June 26 (Mon.). Railway Benevolent Institution, Railway Clearing House, 163 Eversholt Street, N.W.1, at 4 p.m. Annual meeting of members.

June 30-July 3 (Fri.-Wed.). Railway Students Association annual convention at Oriel College, Oxford.

July 1 (Sat.). The Permanent Way Institution, visit to Plymouth. Joint meeting with Exeter & West of England Section.

July 1 (Sat.). The Railway & Canal Historical Society, boat trip on the Staffordshire & Worcestershire Canal.

OFFICIAL NOTICES

ASSISTANT CHIEF ENGINEER RAILWAY DEPARTMENT SIERRA LEONE

Qualifications: Candidates, not less than 35 years of age, must be A.M.I.C.E. or have equivalent qualification recognised by the Institution of Civil Engineers with at least ten years experience on railway civil engineering projects of which at least two years must have been in a position of administrative authority.

Duties: Assisting Chief Engineer in complete control of Engineering Branch, which consists of the maintenance of permanent way, bridges, buildings, water supplies, etc., and all new works and rehabilitation of the railway.

Terms of Appointment: On contract for two tours of from 15-18 months, with gratuity of 15%.

Emoluments: In scale £2,200-£2,365 p.a.

Free passages: Generous home leave.

Apply Sierra Leone Recruiting Agency, Room 756, Sanctuary Buildings, Great Smith Street, London, S.W.1, quoting BCD10/15/06/D15 and giving full name and age and brief details of qualifications and experience.

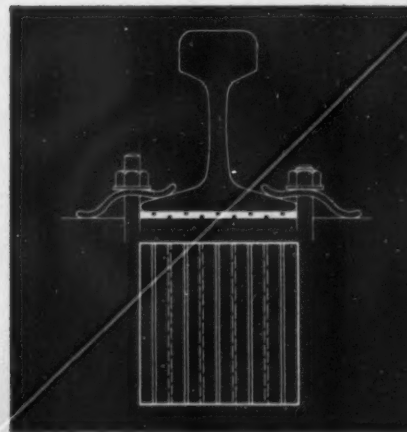
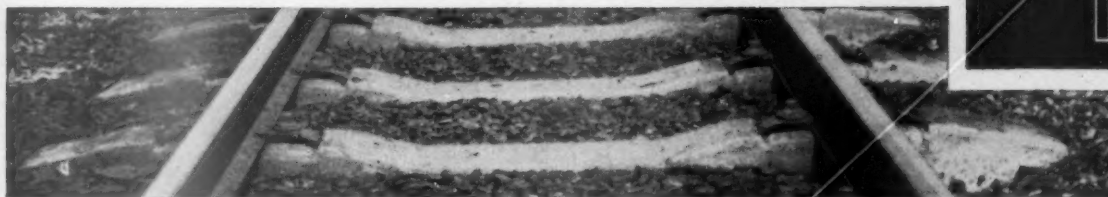
NEW ZEALAND GOVERNMENT RAILWAYS DEPARTMENT

It is proposed to purchase one Sleeper Adzing and Boring Machine. Tenders are due to close in New Zealand on July 26, 1961.

Manufacturers of this type of machine are invited to apply for tender documents to:

Chief Purchasing Officer, New Zealand Government Offices, Purchasing Branch (C/F99/3289), Adelphi Building, John Adam Street, London, W.C.2.

Say 'rail pads'



and you've said

Spencer Moulton because Spencer Moulton's part in their development goes back over twenty years to pioneer work with SNCF, and more recently with British Railways. And much the same has been true for over a hundred years of almost every other application of rubber to railway engineering—say 'springs', say 'drawgear', say what you will, Spencer Moulton have been 'there' right at the start of each innovation and aim to continue that way. Please write to us for illustrated literature or advice on any design or production supply problems you may have concerning rubber — natural or synthetic.

GEORGE SPENCER, MOULTON AND COMPANY LIMITED



Bradford-on-Avon, Wilts. Phone 2191
London: Avon House, Mabledon Place, London, W.C.1 Euston 2201

Photographs by
kind permission
of British Railways



WICKHAM OF WARE

LOOK TO YOUR OVERHEADS



Wickham manufacture a wide range of maintenance cars, extending from forty seater double-end control heavy gang cars to single-seater light inspection trolleys, for all duties.

Illustrated is a very useful type for tunnel, bridge and overhead electric maintenance. The insulated elevating tower is hydraulically operated by an engine-driven pump, the top platform being fully rotatable. Double-end control is provided with four speeds in either direction, the power unit being a petrol engine, or, if preferred, a diesel. Totally enclosed compartments at each end provide ample storage and working space for the crew. Platform heights can be arranged to suit requirements.

WICKHAM PRODUCTS:

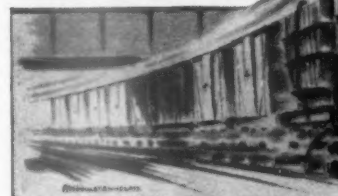
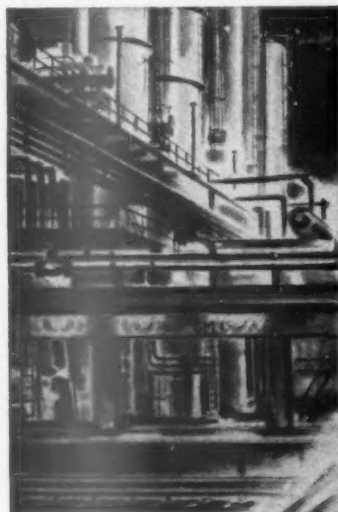
DIESEL RAILCARS, LIGHTWEIGHT RAILBUSES,
INSPECTION CARS, TOWER TROLLEYS, GANG
CARS, PUMP TROLLEYS, TRACK EQUIPMENT.

D. WICKHAM & COMPANY LIMITED
WARE, HERTFORDSHIRE, ENGLAND

Telephones: WARE 394-6
Cables: Wickham Ware



PRODUCED BY



Imperial Chemical Industries are large users of British Railways' freight services, both for a wide variety of products, including chemicals, dyestuffs, fertilizers, metals and plastics, and the raw materials used in making them. Some are packed goods but many move in bulk, the liquids in tanks and the solids in new modern wagons some of which are equipped for pneumatic discharge. Journeys take in the whole of the British Isles and extend to the Continent, but whatever the goods, whether packed or in bulk, and wherever the journey, Rail Freight can tackle the job.

EXPRESS FREIGHT TRAINS - British Railways run more than 800 every day - many giving next morning arrivals over long distances. Charges are fully competitive.

Ask your local Goods Agent for details. Ask also about **EXPORT EXPRESS**. From many towns British Railways Export Express services give scheduled **NEXT-DAY DELIVERY** for wagon load traffic to London docks (Royal, India and Millwall Groups), Merseyside, Manchester, Hull, Glasgow, Grangemouth and Southampton.

SPEEDED BY

BRITISH RAILWAYS

MODERN FREIGHT SERVICES



GRIFFITHS

Protective Paints

offer a complete service for the protection of bridge steelwork, station concourses, signals, gantries and station buildings.



Photograph by kind permission of Railway Department, N.S.W.

FERRODOR

The most efficient and best known of all anti-corrosive paints. Only carefully graded and hand picked micaceous iron oxide of the very highest quality is used in Ferrodor.

RAPIDAL

Rapidal 310 is unsurpassed for signals, being non-dulling, light reflecting and permanent.

MELANOID

The No. 1 QUALITY Bituminous Black in the range has been officially approved for under-side work especially where high humidity is encountered. A full range is available to meet a variety of conditions.

**PAINTS ARE SUPPLIED TO—
B.R. SPEC. 35**

SPECIAL PROBLEMS REQUIRE SPECIAL TREATMENT

Griffiths Brothers are well equipped to advise on any Protective Paint Problem. We maintain a staff of technically competent Representatives who will investigate your problem on site and offer you advice backed by our Research Department.

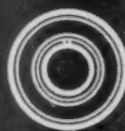
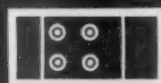
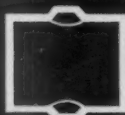


GRIFFITHS BROS. & CO. LONDON LTD.
ARMOUR WORKS, WELL LANE, WEDNESFIELD, STAFFS.
ALSO AT:— LONDON, MANCHESTER, GLASGOW & CARDIFF.



nylon
at its best
is called

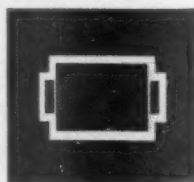
NYLASTIC



The Nylastic bearing is now firmly established as the ideal bush for swivel arm and lever applications. Nylastic is also used for steering joints, diesel fuel pump coupling discs, chain reaction pads, cable support clips, and is used with combinations of rubber and metal for steering column bearings, anti-vibration clips, earthing clips, etc.

The experience gained over the past years enables us to give a unique service in advice and design for this increasingly popular material. Our Technical Staff is available to give you information and suggest schemes for your particular applications.

HOWARD CLAYTON-WRIGHT LTD



**WELLESBOURNE
WARWICK
ENGLAND**

Telephone: WELLESBOURNE 316
Telegrams: 'CLATONRITE' Wellesbourne



Maybach diesels power the new Hymek locomotives

Bristol Siddeley Maybach* diesel engines have been chosen for the new Hymek diesel-hydraulic locomotives. 95 of these Type 3 locomotives have been ordered for main-line use on British Railways Western Region. This now brings the total order placed with Bristol Siddeley for British Railways to 286.

DESIGNED FOR ECONOMIC OPERATION

Bristol Siddeley Maybach rail traction diesel engines range from 384 to 2,000 hp and embody design features which produce more efficient operation in terms of lower wear, greater reliability and easier servicing.

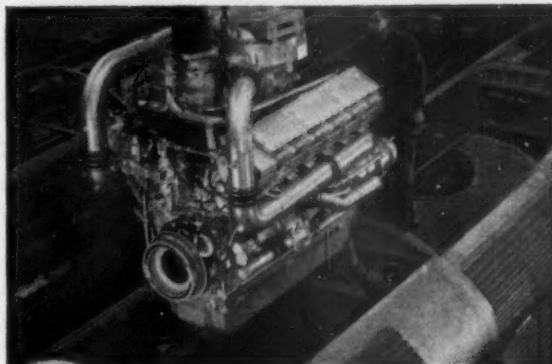
The immensely strong, roller bearing disc-webbed crankshaft, for example, is extremely rigid in its tunnel housing.



Disc-webbed, roller bearing crankshaft and tunnel housing

This results in very low main and big-end bearing wear. The pressure-oil cooling of the pistons gives effective heat dissipation which reduces liner and gas ring wear to a minimum.

Since the majority of components are identical in all models, spares stocks can be cut and servicing is simplified through interchangeability.



Maybach diesel engine being installed in D800 Class at Swindon.

WORLD-WIDE SERVICE

Maybach engines are in service all over the world, and have built for themselves an unsurpassed reputation as the most efficient diesel engines of today. This reputation, backed by the efficient Bristol Siddeley after-sales and spares service, offers the most satisfactory solution to all rail traction requirements.

For further information, please write to: Power Sales Manager, Power Division, Bristol Siddeley Engines Limited, PO Box 17, Coventry, England. Cables: Brisidair, Coventry.

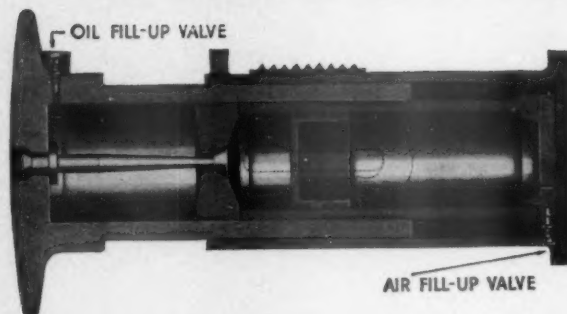
*Manufactured in the UK under exclusive licence from Maybach-Motorenbau GmbH.

BRISTOL SIDDELEY ENGINES LIMITED

TURBOJETS - TURBOFANS - TURBOPROPS - RAMJETS - ROCKET ENGINES
MARINE AND INDUSTRIAL GAS TURBINES - MARINE, RAIL AND INDUSTRIAL
DIESEL ENGINES - PISTON ENGINES - PRECISION ENGINEERING PRODUCTS

TURPLAT *Hydro-Pneumatic* BUFFERS...

The Hydraulic and Air Cylinders are enclosed, and thus fully protected from damage by dirt and corrosion. The efficiency does not depend upon sealing between the plunger and casing where there is vulnerability to such damage.



... *For maximum protection*

Also SPRING BUFFERS, COIL SPRINGS, RAIL KEYS, DROP STAMPINGS

GEO. TURTON, PLATTS & CO. LTD.
WINCOBANK · SHEFFIELD

Tel. No. 386921

Grams: Buffer Sheffield

LONDON OFFICE:
13-15 BUSH LANE HOUSE, CANNON ST., E.C.4

THE RAILWAY GAZETTE

A journal of Railway Management, Engineering, Operation and Railway News. Weekly 2s. Annually £5 by post.

DIESEL RAILWAY TRACTION

A monthly review of world-wide developments in diesel-engine design and diesel railway traction. Monthly 2s. 6d. Annually 35s. by post.

SHIPBUILDING AND SHIPPING RECORD

A journal of Shipbuilding, Marine Engineering, Docks, Harbours, and Shipping. Weekly 2s. Annually £5 by post.

NEW COMMONWEALTH

Describes and illustrates significant developments in production, trade, transportation, and related spheres in all countries of the Commonwealth. Monthly 2s. 6d. Annually £2 by post.

COLLIERY ENGINEERING

A practical journal for Colliery Managers and Engineers, and manufacturers of Colliery Equipment. Monthly 2s. 6d. Annually £2 by post.

COKE AND GAS

A technical journal dealing with the scientific and technical problems involved in the production of coke and gas in coke ovens and gasworks. Monthly 2s. 6d. Annually 35s. by post.

THE INDUSTRIAL CHEMIST

A journal devoted to the progress of applied Chemistry and Engineering. Monthly 2s. 6d. Annually £2 by post.

WOOD

A practical journal, authoritatively written, superbly illustrated, dealing with the growth, marketing and use of wood in all its forms. Monthly 2s. 6d. Annually 35s. by post.

FOOD PROCESSING AND PACKAGING

A journal devoted to the manufacture, packaging, and marketing of processed foodstuffs. Monthly 2s. 6d. Annually £2 by post.

WATER POWER

A technical journal devoted to the study of all aspects of Hydro-Electric Development. Monthly 2s. 6d. Annually £2 by post.

THE RAILWAY MAGAZINE

A popular magazine containing illustrated articles on Railways and Locomotives. Monthly 2s. 6d. Annually 35s. by post.

MINE AND QUARRY ENGINEERING

Articles of technical nature cover geology, modern methods of prospecting, the winning of ore and stone, the dressing of ore and minerals, and extraction metallurgy. Monthly 2s. 6d. Annually 35s. by post.

TOTHILL PRESS LIMITED 33, Tothill Street, Westminster, London, S.W.1

PROVIDENT MUTUAL LIFE ASSURANCE ASSOCIATION

(FOUNDED 1840)

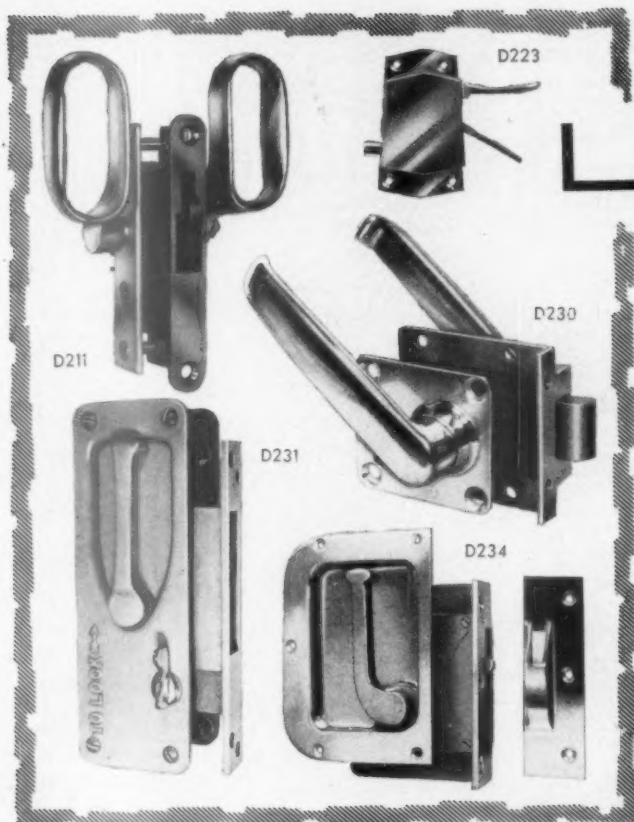
FUNDS . . £25,000,000

The PROVIDENT MUTUAL is a mutual and co-operative Association, the business being conducted solely for the benefit of the Policy Holders.

Life and Endowment Assurance to suit every requirement, including HOUSE PURCHASE. Premiums deducted through the paysheets.

Apply for particulars to:

J. M. ROBERTSON, Managing Director, 25-31, Moorgate, London, E.C.2.



BERESFORD LOCKS

AND COACH FITTINGS

Beresford locks are made to a standard which has not been relaxed in 75 years, and the designs are both practical and simple. It's an economy to fit Beresford locks if you're looking for complete reliability. There is an extensive range of standard designs, most of which may be varied to accord with customer's particular requirements. We also make a range of door furniture, catches and other coach fittings and will be pleased to forward details.

Beresford folding wash basins save space and look neater. They are robust, practical and efficient. Several designs are available, and materials include stainless steel, white metal and anodised aluminium.



BERESFORD

JAMES BERESFORD & SON LIMITED
(Member of The Cornercroft Group of Companies)
Ace Works, Kitts Green, Birmingham, 33
Telephone: Stechford 3081

CONVEYANCER - SCOTT

Electric Trucks and Tractors



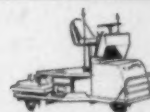
New Additions to the Conveyancer Range . . . Scott Electric Vehicles . . . towing tractors, elevating and fixed platform trucks . . . Electronically controlled "Robotug" systems . . . The Scott electric truck in all its various forms is being used extensively throughout Great Britain . . . in station sorting offices of the General Post Office, in goods and passenger stations of British Railways, in factories and in hospitals. Write for illustrated literature.



ELECTRIC INDUSTRIAL TRACTOR



ELECTRIC FIXED PLATFORM TRUCK



ELECTRIC HORSE (LOW OR HIGH PICK-UP MODELS)



ELECTRIC PLATFORM TRACTOR



ELECTRIC LOW LOADER ELEVATING PLATFORM TRUCK AND LOW LOADER FIXED PLATFORM TRUCK

Conveyancer-Scott

ELECTRIC VEHICLES LTD.

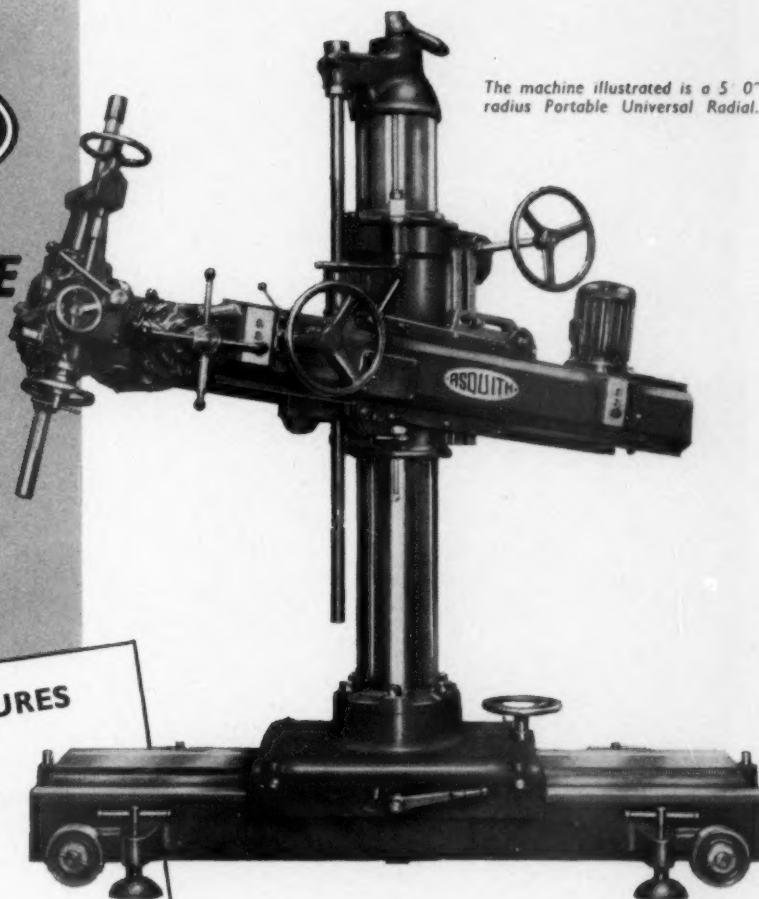
LIVERPOOL ROAD, WARRINGTON
Telephone: 33240, Grams: Hydraulics, Warrington

INDEX TO ADVERTISEMENTS

Abingdon King Dick, Ltd.	—	Clyde Rubber Works Co., Ltd.	—	Hasler Telegraph Works, Ltd.	—	Monarch Controller Co., Ltd.	—	Smith, John (Keighley), Ltd.	—
Abtus, Ltd.	—	Cobra (Wood Treatment), Ltd.	—	Henderson & Keay, Ltd.	—	Murex Welding Processes, Ltd.	—	Smith, Thos., & Sons (Rodey), Ltd.	—
Aircraft Marine Products (Gt. Britain), Ltd.	—	Cockerill, S. A., Cugree	—	Henricot, Usines Emilie, S. A.	37	—	—	Smith, W., Gilmour & Co., Ltd.	—
Allfoc Water Treatment Service	—	Colvilles, Ltd.	—	Henschel Werke, G.m.b.H.	—	—	—	Southern Forge Co., Ltd.	—
Alldays & Onions, Ltd.	—	Commonwealth Sales Corporation	26	Hitachi, Ltd.	—	—	—	South Wales Switchgear Co., Ltd.	—
Allen, Edgar, & Co., Ltd.	—	Consolidated Pneumatic Tool Co., Ltd.	—	Hoffmann Manufacturing Co., Ltd.	—	National Provincial Bank	—	S.P.E. Co., Ltd.	—
Allgemeine Elektrizitäts Gesellschaft	—	Conveyancer Fork Trucks, Ltd.	47	Holman Bros., & Co., Ltd.	—	Neal, R. H., & Co., Ltd.	—	Spencer Moulton, George, & Co., Ltd.	41
Andre Rubber Co., Ltd.	—	Cooper, Geo., & Sons	—	Howard Pneumatic Engineering Co., Ltd.	—	Newton Bros. (Derby), Ltd.	—	Standard Telephones & Cables, Ltd.	24
Armstrong Patents Co., Ltd.	49	Coventry Machine Tool Works, Ltd.	—	Hudswell Clarke & Co., Ltd.	—	Nippon Signal Co., Ltd.	—	Steel Coy. of Wales, Ltd.	—
Associated British Machine Tool Makers, Ltd.	—	Cowans, Sheldon & Co., Ltd.	—	Hunslet Engine Co., Ltd.	—	North Bar Tool Co., Ltd.	—	Steel, Peech & Tozer	—
Associated Electrical Industries-G.R.S., Ltd.	50	Craven Bros. (Manchester), Ltd.	—	Hyde, Robert, & Son, Ltd.	—	North British Locomotive Co., Ltd.	—	Steels Engineering Products, Ltd.	9
Associated Electrical Industries (Manchester), Ltd.	40	Cravens, Ltd.	—	—	—	Nuts & Bolts (Darlaston), Ltd.	—	Stirk, John, & Sons, Ltd.	—
Associated Electrical Industries (Rugby), Ltd.	—	Crompton Parkinson, Ltd.	20	Illingworth, E., & Co., Ltd.	—	—	—	Stone, J., & Co. (Deptford), Ltd.	—
Associated Electrical Industries (Woolwich), Ltd.	—	—	—	Imperial Aluminium Co., Ltd.	—	—	—	Stream Line Filters, Ltd.	—
Associated Lead Manufacturers, Ltd.	12	Davey, Paxman & Co., Ltd.	—	Imperial Chemical Industries, Ltd.	—	Oleo Pneumatics, Ltd.	—	Suffolk Iron Foundry (1920), Ltd.	—
Atlas-Copco A/B	—	Davies & Metcalfe, Ltd.	34	Interchangeable Tool Co., Ltd.	—	Ormerod Shapers, Ltd.	—	Sulzer Bros. (London), Ltd.	—
Auster, Ltd.	—	Dean, Smith & Grace, Ltd.	—	Intermit, Ltd.	—	Osborn, Samuel, & Co., Ltd.	—	Summers, Thos., & Sons, Ltd.	—
Austin Taylor Electrical, Ltd.	—	Docker Brothers	25	International Twist Drill Co., Ltd.	—	Ottermill Switchgear, Ltd.	—	Swiss Car & Elevator Manufacturing Corp.	—
Automotive Products Co., Ltd.	—	Dorman Long (Africa), Ltd.	—	Iscia Foundry, Ltd.	—	Owen & Dyson, Ltd.	—	Swiss Industrial Company	—
—	—	Dowty Electricals, Ltd.	—	Isothermos, Société Internationale des Applications	—	—	—	Swiss Locomotive & Machine Works	—
—	—	Dragonair, Ltd.	—	—	—	—	—	Sylglas Company, The	—
—	—	Drewry Car Co., Ltd.	—	—	—	—	—	—	—
—	—	Drummond Asquith, Ltd.	49	—	—	—	—	—	—
—	—	Du Pont (United Kingdom), Ltd.	7	—	—	—	—	—	—
Bagnall, W. G., Ltd.	—	—	—	Jackson Vibrators, Inc.	32	P. & M. Co. (England), Ltd.	—	—	—
Baker, John, & Bessemer, Ltd.	—	Eagre Construction Co., Ltd.	—	—	—	Palnut Co., Ltd., The	—	—	—
Bayliss, Jones & Bayliss, Ltd.	—	Elastic Rail Spike Co., Ltd.	—	Kaye, Joseph, & Sons, Ltd.	—	Parkinson Cowan Industrial Products, Ltd.	—	Talbot Waggonfabrik	—
Beckett, Laycock & Watkinson, Ltd.	—	English Electric Co., Ltd.	—	Kearns, H. W., & Co., Ltd.	—	Parkinson, J., & Son (Shipley), Ltd.	—	Tanges, Ltd.	—
Belships Co., Ltd., Skibs A/S	16	English Steel Corporation, Ltd.	3	Kearsley, Robert, & Co.	—	Patterson Hughes Engineering Co., Ltd.	—	Tarmac Roadstone Ltd.	—
Benjamin Electric Co., Ltd.	—	E.N.V. Engineering Co., Ltd.	—	Kendall & Gent, Ltd.	—	Pearson Machine Tool Co., Ltd.	—	Taylor Bros. & Co., Ltd.	—
B.E.N. Patents, Ltd.	—	Ericssons Signalaktiebolag, L.M.	—	Kenitra Co., Ltd.	—	Pel, Ltd.	—	Taylor Bros. (Sandiacre), Ltd.	—
Beresford, James & Son Ltd.	47	Eutectic Welding Alloys Co., Ltd.	—	King, George W., Ltd.	—	Permail, Ltd.	—	Taylor, F., & Sons (Manchester), Ltd.	—
Berry, Henry, & Co., Ltd.	—	Expanded Rubber Co., Ltd.	—	Kisha Seizo Kaisha, Ltd.	—	Peters, G. D., & Co., Ltd.	—	Taylor Rustless Fittings Co., Ltd.	—
Beyer, Peacock, Ltd.	—	Eyre Smelting Co., Ltd.	—	Kitchen & Wade, Ltd.	—	Philplus, Ltd.	—	Tearne & Sons, Ltd.	—
Beyer, Peacock Gorton, Ltd.	—	—	—	Klochner-Humboldt-Deutz, A.G.	—	Pirelli-General Cable Works, Ltd.	—	Tees Side Bridge & Engineering Works, Ltd.	—
Beyer, Peacock (Hymek), Ltd.	—	—	—	Knorr-Bremse, G.m.b.H.	33	Planwell Engineering Co., Ltd.	—	Telephone Manufacturing Co., Ltd.	—
Beyer, Peacock, Railway Equipment, Ltd.	1	—	—	Krauss, Maffei, A.G.	—	Plasser & Theurer	—	Thermit Welding (Gt. Britain), Ltd.	—
Bintex, Ltd.	—	—	—	Kretz, P., Ing. Dipl.	—	Player Railway Machinery (G.B.), Ltd.	—	Thomas, Richard, & Baldwin, Ltd.	5
Birfield Industries, Ltd.	—	—	—	Krupp, Fried., Maschinenfabriken	—	Powell Duffryn Engineering Co., Ltd.	6	Thompson, John, Motor Pressings, Ltd.	—
Birkett, T. M., Billington & Newton, Ltd.	—	—	—	Kugelfischer Georg Schaefer & Co.	—	Preformed Line Products (Gt. Britain), Ltd.	—	Thomson, Thomas, Sons & Co. (Barrhead), Ltd.	—
Birmingham Railway Carriage & Wagon Co., Ltd.	—	—	—	Kyosan Electric Mfg. Co., Ltd.	—	Pressed Steel Co., Ltd.	19	Toledo Woodhead (Sheffield), Ltd.	—
Bolton Gate Co., Ltd.	—	Fairclough, Leonard, Ltd.	—	—	—	Provident Mutual Life Assurance Association	46	Town, Fredk., & Sons, Ltd.	22
Bolton, Thos., & Sons, Ltd.	—	Falk, Stadelmann & Co., Ltd.	23	Lace Web Spring Co., Ltd.	—	—	—	Transport Brakes, Ltd.	—
Bonded Laminates, Ltd.	2	Fawcett Preston & Co., Ltd.	14	Lamp Manufacturing & Railway Supplies, Ltd.	18	Railko, Ltd.	—	Transport Engineering Equipment, Ltd.	—
Booth, James, Aluminium, Ltd.	29	Ferguson Battery Co., Ltd.	8	Lang, John, & Sons, Ltd.	—	Railway Signal Co., Ltd.	—	Trico-Folberth, Ltd.	—
Bowmaker (Plant), Ltd.	—	Ferodo, Ltd.	—	Lamigraph Ltd.	—	Ransomes & Rapier, Ltd.	—	Tulloch, Ltd.	—
Boydell, E., & Co., Ltd.	—	Finlay Engineering, Ltd.	—	Lansing Bagnall, Ltd.	—	Rawlings Manufacturing Co., Ltd.	—	Turton, Geo., Platts & Co., Ltd.	46
Bristol Siddeley Engines, Ltd.	45	Flexitol Engineering Co., Ltd.	—	Lansing, A.G.	—	Regent Oil Co., Ltd.	—	Turton, Thos., & Sons, Ltd.	21
Britannia Batteries, Ltd.	—	Fowler, John, & Co. (Leeds), Ltd.	—	Laycock Engineering, Ltd.	—	Reynolds, A., & Co., Ltd.	—	Tyer & Co., Ltd.	—
British Electrical Repairs, Ltd.	—	French Railways	—	Le Carbone (Great Britain), Ltd.	—	Rheinthal Sieger Eisenbahnbedarf, A.G.	—	—	—
British Ermeto Corp., Ltd.	—	—	—	Leeds Engineering & Hydraulic Co., Ltd.	—	Richards, Chas., & Sons, Ltd.	—	—	—
British Insulated Callender's Cables, Ltd.	—	—	—	Levick, John, Ltd.	18	Roberts, Charles, & Co., Ltd.	—	United Steel Companies, Ltd.	38
British Insulated Callender's Construction Co., Ltd.	—	Ganz-Mavag	—	Lifting Gear Products (Engineering), Ltd.	—	Roberts, J. W., Ltd.	—	—	—
British Oxygen Co., Ltd.	11	General Electric Co., International	—	Lockheed Precision Products, Ltd.	—	Rolls-Royce, Ltd.	—	Vacuum Brake Co., Ltd.	—
British Oxygen Gases, Ltd.	—	General Electric Co., Ltd.	10	Lockspike, Ltd.	—	Rozalex, Ltd., A.G.	—	Vokes, Ltd.	—
British Paints, Ltd.	—	General Motors Overseas Operations	39	Londex Ltd.	—	Ruston & Hornsby, Ltd.	—	Vulcanised Fibre, Ltd.	—
British Railways	43	General Steel Industries Inc.	26	London Transport Executive	—	—	—	—	—
British Timken, Division of The Timken Roller Bearing Company	—	Glacier Metal Co., Ltd.	—	Luwa, G.m.b.H.	—	Sankey, Joseph, & Sons, Ltd.	—	—	—
British United Traction, Ltd.	—	Gloucester Railway Carriage & Wagon Co., Ltd.	17	—	—	Saunders Valve Co., Ltd.	—	Walker, James, & Co., Ltd.	—
Bromsregulator Svenska Akt.	28	Godwin Warren (Engineering), Ltd.	—	Macdonald, John, & Co. (Pneumatic Tools), Ltd.	—	Scammell Lorries, Ltd.	—	Ward, H. W., & Co., Ltd.	—
Brown Bayley Steels, Ltd.	—	Greenwood's & Airvac Ventilating Co., Ltd.	—	Macroft Wagons, Ltd.	—	Schindler Carriage & Wagon Co., Ltd.	—	Ward, Thos. W., Ltd.	22
Brown, David (Industries), Ltd.	—	Gresham & Craven, Ltd.	—	Marsden, Samuel, & Son, Ltd.	—	Scottish Machine Tool Corporation, Ltd.	30	Werkspoor, N.V.	—
Brush Traction, Ltd.	—	Griffiths Bros. & Co. (London), Ltd.	44	Marston Excelsior, Ltd.	—	Setright Registers, Ltd.	—	Westinghouse Brake & Signal Co., Ltd.	4
B.T.R. Industries, Ltd.	—	Grover & Co., Ltd.	—	Maschinenfabrik Augsburg-Nürnberg, A.G.	—	Sheffield Twist Drill & Steel Co., Ltd.	—	White, R., & Sons (Engineers), Ltd.	—
Bull, John, Rubber Co., Ltd.	—	—	—	Massey, B. & S., Ltd.	—	Siebe Gorman & Co., Ltd.	—	Wickham, D., & Co., Ltd.	42
Bullers, Ltd.	—	—	—	Matus Equipment, Ltd.	—	S.G.E. Signals, Ltd.	—	Wild, A. G., & Co., Ltd.	—
Butler Machine Tool Co., Ltd.	—	—	—	Maus, J.M.J., Ltd.	—	Siemens & Halske, Akt. Silentbloc, Ltd.	—	Williams, Henry, Ltd.	27
—	—	—	—	Metallastik, Ltd.	—	Simmonds Aerocessories, Ltd.	—	Winn & Coates, Ltd.	—
—	—	—	—	Metallic Seamless Tube Co., Ltd.	—	Simmonds & Stokes (Niphan), Ltd.	—	Workington Iron & Steel Co.	38
Caterpillar Tractor Co., Ltd.	—	—	—	Metropolis-Cammell Carriage & Wagon Co., Ltd.	13	Simon Engineering Dudley Ltd.	—	Wright Anderson & Co., Ltd.	—
C.A.V., Ltd.	36	Hackbridge & Hewitt Electric Co., Ltd.	—	Miller, John, & Son Ltd.	31	Skefko Ball Bearing Co., Ltd.	—	Wynn-Williams, Llewelyn, Ltd.	—
Chapman, A. W., Ltd.	—	Hackbridge Cable Co., Ltd.	—	Mills, The Exors. of James, Ltd.	—	Smith's Industrial Instruments, Ltd.	—	—	—
Chipman Chemical Co., Ltd.	—	Hadfields, Ltd.	—	Miner, W. H. Inc.	35	—	—	—	—
Churchill Machine Tool Co., Ltd.	—	Hallam, Sleigh & Cheston, Ltd.	—	Mirrlees, Bickerton & Day, Ltd.	15	—	—	—	—
Clayton-Wright, Howard, Ltd.	44	Hardy Spicer, Ltd.	—	Mitchell, Shackleton & Co., Ltd.	—	—	—	—	—
Cleveland Bridge & Engineering Co., Ltd.	—	Harper, John, & Co., Ltd.	—	—	—	—	—	—	—
Cleveland Meters, Ltd.	—	Harvey, G. A., & Co. (London), Ltd.	—	—	—	—	—	—	—



**The PORTABLE
UNIVERSAL
RADIAL**
of modern
design



The machine illustrated is a 5' 0" radius Portable Universal Radial.

UP-TO-DATE FEATURES

Shaft drive from Motor
(no belts)

Ball bearing rolls to
"in" and "out" traverse of arm

Wide range of feeds and speeds

Quick return after tapping

Power and hand elevating and
lowering to arm

Exceptional ease of control

A robust machine of up-to-date design which ensures trouble free operation. It incorporates a large number of ball journal bearings; special attention has been paid to efficient clamping of the swivelling parts and shaft drive from the motor is a noteworthy modern feature. The arm can be elevated in a dead vertical position to facilitate tool changing, etc. Write today and ask for full details of the Asquith Portable Radial.

Built in 4 sizes with radius 4 ft., 5 ft., 6 ft. or 7 ft.

WILLIAM ASQUITH LTD.
HALIFAX · ENGLAND

Member of the Asquith Machine Tool Corporation

Sales and Service for the British Isles

DRUMMOND - ASQUITH LIMITED

Member of the Asquith Machine Tool Corporation

KING EDWARD HOUSE, NEW ST., BIRMINGHAM Phone: Midland 3431. Also at LONDON Phone: Trafalgar 7224 & GLASGOW Phone: Central 0922

Greater speed and simplicity in remote signal control



View of Type 'S' Control panel for remotely operating a station on a single line of railway. Front cover has been removed to show relays.

WITH THE

AEI-GRS Type S remote control system

The Type S remote control system, developed by AEI-GRS, provides a swift, simple and economical means of remote control and indication, using a minimum of apparatus. Designed specifically for remote control of a single location this 'synchronous stepping' code system is based on a unique principle employing the free swings of two mechanical oscillators—one at each end of the circuit—to create the steps of the code.

METHOD OF OPERATION

CONTROL action completed in 1 second

To control a field device, a switch on the control machine, is moved to set up the appropriate code in the control office application unit. This code is transferred to the stepper unit and transmitted over the line circuit to the field apparatus. The field stepper unit on receiving the code applies it to the field application unit, which responds to the particular code message and controls the function relay operating the field device. This entire control operation takes approximately one second to complete.

INDICATION given in 2 seconds

When a field device changes position, it notifies the field application unit which automatically starts the stepper unit transmitting the appropriate code back to the control office, where an indication light on the control panel diagram shows the new position of the field device. Indication is completed in about two seconds.

SIMPLEX AND DUPLEX SYSTEMS

Type S remote control system installations of many types can be furnished to meet special traffic requirements, from a Simplex 7-step system with a capacity of 32 control codes, to a Duplex 11-step system providing a maximum of 1,024 control codes.

Already this AEI-GRS system has proved highly successful in many installations, and can maintain a frequency of up to 200 pulses. As in all coded systems, codes are contained in a series of steps, or intervals. However, with the Type S system the use of mechanical oscillators to create the steps ensures that codes are of uniform length and that stepping speeds are always constant irrespective of normal voltage variations. Conventional signal lines can be employed and provision made for voice or telegraphic communication over the same wires if desired.

AEI

Associated Electrical Industries-GRS Limited

132-135 LONG ACRE, LONDON, W.C.2

TEMPLE BAR 3444

